

THE SCOTTISH GEOGRAPHICAL MAGAZINE



Volume 71, No. 2

September 1955

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THE SCOTTISH GEOGRAPHICAL MAGAZINE

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TRAVELLERS ALL

A. C. O'DELL

Chairman's Valedictory Address to the Aberdeen Branch of the Royal Scottish Geographical Society. 15th March 1955.

GEOGRAPHY and travel are not synonymous terms, but no one would deny that travel, with a seeing eye, adds vigour to a study of geography. At more than one period geographical texts have made the subject appear desiccated and wizened, but fortunately there has each time been a fresh injection of life, and on each occasion this has been associated with a period of travel—whether of explorers in hitherto unknown regions or of enquiring visitors to a neighbouring land.

Through the ages men have travelled—to trade, to propagate their faith, to satisfy a lively sense of curiosity (whether casual or scientific), to pass the time, to seek health, to satisfy a restlessness, to escape—and a fraction of these multitudes have recorded their experiences and also tried to say just why they travelled. Horace, in his letter to a traveller, raised the questions we now ask about Paris, Washington or Rio de Janeiro :

“How like you Chios, good Bullatius? What
Think you of Lesbos, that world-famous spot?
What of the town of Samos, trim and neat,
And what of Sardis, Croesus' royal seat?
Of Smyrna what and Colophon? Are they
Greater or less than travellers' stories say?
Do all look poor beside our scenes at home,
The field of Mars, the river of old Rome?”

Epistles I, ii (trans. John Conington)

While again the cry of Catullus, “Away let us fly to the renowned cities of Asia! My soul flutters in anticipation, and my eager feet rejoice”, finds an echo in Flecker's *Hassan* with its sense of excitement at a journey starting :

“MASTER OF THE CARAVAN—Open the gate, O Watchman of the night!

THE WATCHMAN—Ho travellers, I open. For what land
Leave you the dim-moon city of delight ?

MERCHANTS—We take the Golden Road to Samarkand ! ”

Men and women from all walks of life—soldier, sailor, tinker, tailor, rich man, poor man, apothecary, thief—have felt this urge to travel. Thomas Rees, apprenticed to a tailor, felt this desire and also that feeling of apprehension at the start of fulfilment. “Having had a very great desire . . . to be able to visit foreign countries I volunteered . . . into the royal marines. . . . I had never been out to sea before ; and as the land began to disappear from my view . . . my heart sunk within me.”¹ “Join the Forces and see the world” is still the motif of many a recruiting appeal. In post-war years Geography Departments have gained by the influx of ex-service students who have had experience of foreign travel, although in artificial conditions. So vast is the literature that consideration will be limited to the eighteenth and nineteenth centuries and also to travel in the British Isles and Europe. This period is of particular interest in that it reveals the revolution in methods of travel which brought the opportunity of travel to multitudes. These centuries saw, of course, great explorations, but accounts of these are ignored in this paper as also are the mass holiday movements to resorts such as Blackpool, Brighton and Biarritz. This review will be limited to the traveller touring through a region or a country.

Many people did not approve of this desire to travel for it was held that evils could result from young people travelling and also that it led to impoverishment of an estate—“some silly travellers spend so much in seeing other Men’s Lands, that they are obliged, on their return to sell their own”²—and of the country. On the title page of a Bristol edition of a popular Guide to France³ is the caution : “Not to spend more money in the country of our natural enemy, than is requisite to support with decency the character of an English Man”. In the eighteenth century it became the fashion for young men who had been on the Grand Tour to wear extreme continental fashions and these young fops were known as the Macaronis.

Samuel Johnson in *The Idler* castigated the writers of travel books for their approach to travelling and to writing. “The greater part of travellers tell nothing, because their method of travelling supplies them with nothing to be told. He that enters a town at night and surveys it in the morning and then hastens away to another place, and guesses at the manners of the inhabitants by the entertainment which his inn afforded him, may please himself for a time with a hasty change of scenes, and a confused remembrance of palaces and churches. He may gratify his eye with a variety of landscapes, and regale his palate with a succession of vintages: but let him be contented to please himself without endeavouring to disturb others. . . . He only is a useful traveller, who brings home something by which his country may be benefitted. . . .”⁴ British travellers on the continent might well excite derision by their gaucheness and by the tendency to dissipation. Johnson thought this opportunity to sow wild oats an excellent one as it allowed a young man to return home and shake off bad connections !

Undoubtedly it did enlarge the outlook, particularly if the young man was accompanied by a competent tutor. Cowper in *Progress of Error* gives an ironical view of a tour and its effect :

" From school to Cam or Isis, and thence home ;
And thence with all convenient speed to Rome.
With reverend tutor clad in habit lay,
To tease for cash, and quarrel with all day ;
With memorandum-book for every town,
And every post, and where the chaise broke down ;
His stock a few French phrases got by heart,
With much to learn, but nothing to impart ;
The youth, obedient to his sire's commands,
Sets off a wanderer into foreign lands,
Surprised at all they meet, the gosling pair,
With awkward gait, stretch'd neck, and silly stare,
Discover huge cathedrals built in stone,
And steeples towering high much like our own ;

Returning he proclaims by many a grace,
By shrugs and strange contortions of his face,
How much a dunce, that has been sent to roam,
Excels a dunce, that has been kept at home."

Not all travellers toured in the aimless manner derided by Johnson and Cowper, some collected information in a systematic manner. As the rage for studying only art and antiquities abated and as the social changes of the eighteenth century evolved, so the observant traveller widened his outlook and the accounts of his travels acquire a more permanent interest as a record of the contemporary scene. To guide the enquiring tourist various authors incorporated in their hints to travellers lists of questions suitable for obtaining a view of a country or district. Among the authors may be instanced Count Leopold Berchtold and Dr William Kitchiner. The former gave a long list of questions which ranged from the geographical such as, " Is the soil in general fertile, or barren ? " to the distinctly non-geographical such as, " How is the natural sensibility of females increased, and directed to good purposes ? " ⁵

By coach many a person travelled across Europe and it is interesting to look back two centuries to see the vehicles used. Many noblemen took their own post-chaise but this was against the advice of some authorities for it was held that the roads of France would damage carriages designed to suit the better roads of Britain. Some purchased a vehicle at their point of arrival on the continent and sold it before sailing for home and regarded the loss on the transaction as better than damage to their own carriage. Less wealthy travellers patronised the French diligence which, "... with its enormous size, and monstrous clumsiness ... contains three compartments : in front, the body of a chaise holding three ; next a coach holding six ; and then a box holding four, called *Ronde* ; the whole elevated on four wheels of prodigious breadth and strength ... the vehicle is dragged at about six miles an hour by five horses. ... The harness is ill appointed, old,

brown and broken, mended with string and ropes." * Arthur Young, after one experience of a French diligence, declared that never again would he use such a detestable, overcrowded, badly sprung vehicle. So-called stage-coaches ran between Calais and Paris, but as they took seven days for the 183 miles, compared with 54 hours by diligence, no tourist considered using them except for the conveyance of baggage. Leaving Calais in the morning coach passengers supped at Boulogne (27 miles from Calais), and then on successive days at Montreuil (57 miles), Abbeville (81 miles), Poix (105 miles), Beauvais (135 miles), Beaumont (159 miles), and finally arrived the following evening in Paris. Journey costs for a chaise were by *postes*, each of which was about six miles, and by French custom the vehicles were over-horsed compared with British standards; for example, if a chaise carried two passengers instead of one, it had to have, or to pay for at each *poste*, three horses instead of two. About 1780, to pay for tolls, horsing and postillion cost £8, 14s. 6½d. on the journey from Calais to Paris, whereas with the same chaise but two passengers, instead of one, it cost £10, 19s. 2d.

Travellers in France complained of the vehicles, but their experiences seem to have been less arduous than those of travellers in Germany. "My journey [through Bohemia] was one of the most fatiguing I ever took in my life. . . . I did not meet with a chaise, or carriage, of any kind, that had a top or covering, to protect passengers from heat, cold wind, or rain, in my whole journey; and so violent are the jolts, and so hard are the seats of German post-waggons, that a man is rather kicked than carried from one place to another. Yet, for these wretched conveyances, when I travelled in them alone, extra-posts, as it is called, it cost me frequently at the rate of eighteen pence for each English mile." † This writer complained of the numerous charges—horse-hire, chaise-hire, turnpikes, postillion, greasing wheels, toll gates at each town and "*drinkgeld* to hundreds"—as well as the bad inns and food, but at least there was no fear of highwaymen. No wonder that when Pastor Carl Moritz visited England in 1782 he wrote in such eulogistic terms of an English coach. "These coaches are, at least in the eyes of a foreigner, quite elegant, lined in the inside; and with two seats large enough to accommodate six persons. . . . I must observe that they have here a curious way of riding, not in, but upon a stage-coach. Persons to whom it is not convenient to pay a full price, instead of the inside, sit on the top of the coach, without any seats or even a rail. . . . He who can properly balance himself rides not incommodiously on the outside, and in the summer time . . . it certainly is more pleasant than it is within, excepting that the company is generally low." ‡ Moritz did not realise the pleasures of travelling alongside the driver or the guard.

The Belgian stage-coach of the mid-eighteenth century was heavier and more comfortable than its English counterpart: "It has eight chairs, neither of which touch one another, for the passengers to sit in; and each chair has a sash window to put up and take the air, or shut as the passenger pleases. No body rides with their face backwards, but turned towards the horses. They change horses every twelve miles, and go sometimes 90 or 100 miles a day." §

In the Low Countries the usual eighteenth-century method of travel was in large, covered boats drawn by a horse at three miles an hour, and contemporary travellers commented on the shelter from the weather and travel so smooth that a passenger could while away the time by reading. There was scarcely a town in the Netherlands which was not reached daily by a boat service. The boat which ran on the Bruges-Ghent Canal was a remarkable vessel: "for it is a perfect tavern divided into several apartments, with a very good ordinary at dinner of six or seven dishes, and all sorts of wine at moderate prices. In winter they have fires in their *Chimneys*, and the motion of the vessel is so small, that a person is all the way as if he were in a house." ¹⁰

Most travellers in England used the Dover Road ¹¹ and these 72 miles, immortalised by writers from Chaucer to Dickens, have been used through centuries by kings and queens, as well as commoners. Probably because most wealthy people either hired a post-chaise for six pounds or took their own, the coaches on this route never acquired the speed and glamour of those on the Bath or York roads. The 'Dover machine' (Pl. 1), with six teams of horses, did the journey in a day, for which passengers were charged a pound. To avoid the highwaymen perils of Shooters Hill some travellers preferred to travel from Westminster to Gravesend by the Thames, while many spent a night at a Canterbury inn rather than lose their money to highwaymen, hunting in the gloaming, or to the extortionate innkeepers of Dover.

Arrived at Dover the packets sailed, weather and tide permitting, to Calais: to hire cost five guineas, while on an ordinary run half-a-guinea was charged for a gentleman and five shillings for a servant. Both harbours were difficult to enter and travellers were warned of the overcharges made by 'flitboats' between packet and quay and by the hotels, which capitalised on enforced delays. Sometimes the vessels were driven by the wind to Boulogne or Brighton. In 1820 regular steamship services were introduced on the short sea passage.

It is interesting to look back two centuries to see the formalities which beset the tourist. Having paid passage money, "you carry your baggage to the custom house, where it is searched, for which you pay sixpence and sixpence more, called head-money. . . . Coming ashore [at Calais], you are ordered to the intelligence office where your name is taken down, thence you are conducted to the searcher's office, thence to the governor's house where your baggage is strictly searched. To avoid the trouble of having your baggage searched any more on the road to *Paris*, and from going into the custom-house at this metropolis, 'tis advisable to get your trunk plumbed [sealed] for *Lyons*, and to have it directed for you at *Paris*, to be sent by the stage-coach. . . . 'Tis proper before you set out for *Paris* to provide yourself with a passport." ¹²

The term 'Grand Tour' was first used in 1670 by Richard Lassels, who adopted it to convey, in his book *The Voyage of Italy*, the French sense of 'great circuit'. At first it referred specifically to France but was later extended to cover the Grand Tour undertaken by wealthy young men on leaving their university, and they followed regular routes in France, Italy, Switzerland, Germany and the Low Countries. At first the tourists were solely concerned with studying antiquities and

art treasures, and the scenic marvels were barely glanced at until late in the eighteenth century. Early visits to the Swiss mountains such as that by William Windham were more expeditions than tourist journeys, but they encouraged people to visit the area for its own sake and not just to bemoan the fatigues of crossing the Alps on their way to visiting art treasures in Italy.

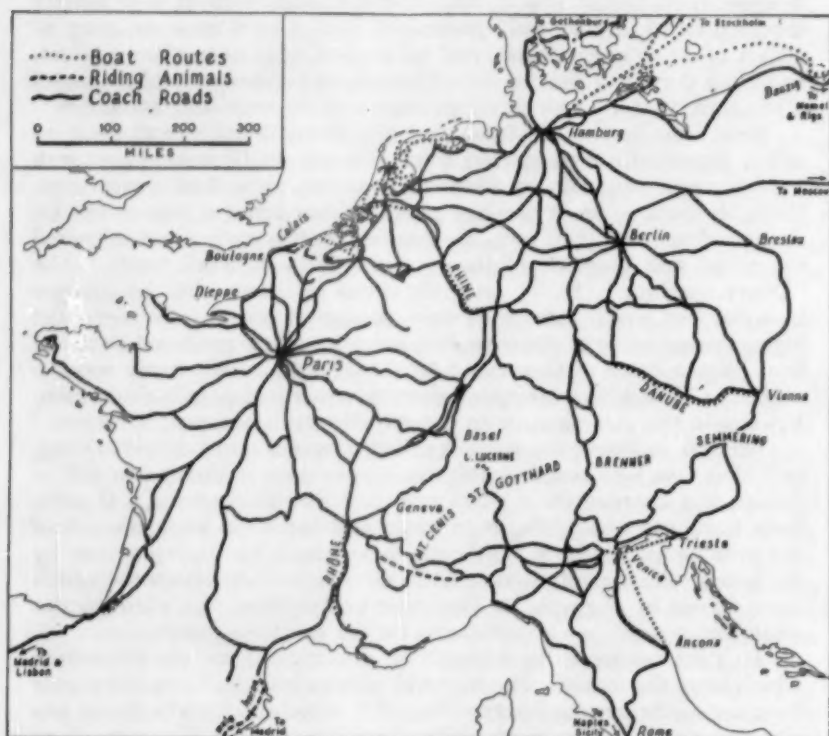


Fig. 1. Routes described in Nugent's *Grand Tour* 1749.

Fears of disaster long weighed in the minds of travellers forced to cross the Alps to and from Italy. In the Brenner valley "the rocks are prodigious high, and when the snow melts, or a sudden thaw comes, the way is very dangerous. The accidents which happen, and the coaches that are over-turned so frequently in these uneven narrow passes, have occasioned the building of the little oratories, which one meets with so often on the road."¹³ The St Gotthard Pass was also feared: "But the most hazardous part is the bridge on the Russ, called the bridge of hell, from the horrid noise the water makes as it tumbles from the rocks, and from the slipperiness of the bridge, which renders it difficult even to foot passengers, who are obliged to creep on all fours, lest the fury of the wind should drive them down the rocks."¹⁴

The aristocratic domination of travel disappeared with the rise of industrialism, and this coincided with the ending of the Napoleonic Wars. The writings of Byron, Wordsworth, Scott and Shelley—to name but the principal romantic writers—created an interest in scenery among the new class which was now able to travel; this class sought its ‘culture’ from English, and not from classical, authors. These newly rich were anxious to travel and, with improvement in communications in the first half of the nineteenth century, thousands followed the trail first beaten by the young ‘milord’ with his tutor. The Grand Tour was finished so far as its original form was concerned and its replacement was caricatured by Richard Doyle in his well-known work, *The Foreign Tour of Messrs Brown, Jones and Robinson*.¹⁵

To serve the aristocratic travellers and their contemporaries various guidebooks and handbooks were issued and also maps. Of the routebooks, one of the most comprehensive was the four-volume work compiled by Thomas Nugent. It provides route descriptions for the journeys indicated in the accompanying map (Fig. 1). These routes, with nodal points such as Paris, Arnheim and Dresden, are claimed as those most used by British travellers abroad. Most of the Grand Tour travel was with the help of horses, but Nugent draws attention to anomalies such as the use of asses to draw the coaches from near Vienna to Lyons, and comments that they will not go an inch beyond their stage, and the use of riding mules from Gerona to Barcelona. For journeys in Britain there were routebooks, such as those produced by Daniel Paterson which went into eighteen editions between 1771 and 1826, which supplemented the road maps of Taylor and Skinner and of Cary. The intricacy of the British road network suitable for coaches was great compared with continental conditions although, to judge from contemporary accounts, the road surface was sometimes poor. Travellers abroad were also served by phrase books which were probably as deceptively useful as the modern version, while handbooks describing the art treasures of continental cities were legion in number.

Travellers, then as now, were vitally interested in hotel accommodation, and certain routes of the Grand Tour became stereotyped because along them were the only good hotels of a district and until alternate roads were improved it was useless to provide elsewhere good hotels. Hotelkeepers at strategic points could make a fortune: Dessin, proprietor of the Hôtel d'Angleterre at Calais, was said to have made a profit of £50,000 between 1767-76 by his activities, which included money-changing and dealing in coaches. English inns in this period of coach travel were famous for their scale and their lavish hospitality, except to the unfortunate pedestrian. “Our landlord in the *New Inn* at Durham, is a jolly honest man—the house is a very fine spacious building, and might serve a bishop.”¹⁶ Persons accustomed to the food of a good inn found the Paris system of just getting a room at a hotel and having the meals sent in rather difficult. Not that all regarded the English hotels as beyond reproach. Some might breathe the thanksgiving:

“Once more I'm safely brought to England's shore
For which, my gracious God, I thee adore.”

but others preferred to echo Byron's words :

" Thy cliffs, *dear* Dover, harbour and hotel ;
 Thy custom house with all its delicate duties ;
 Thy waiters running mucked at every bell ;
 Thy packets, all whose passengers are booties
 To those who upon land or water dwell ;
 And last, not least, to strangers uninstructed,
 Thy long, long bills, whence nothing is deducted."

Hotels at ports such as Dover and Calais were numerous but tended to be of poor quality as travellers were forced to spend nights waiting for a sailing and with a traveller at their mercy the service could be poor and extortionate. In the two years following the Peace of Paris (1763) 40,000 passengers passed through Calais, and in the two years following Waterloo over 90,000 passengers left from Dover, so innkeepers at these ports had unusual opportunities for reaping a harvest.

Travellers on horseback or afoot also existed but there was always the problem of luggage. Innkeepers despised the pedestrian as being poor and there were doubts as to whether he was a vagrant. Wordsworth and Shelley encouraged the cult of pedestrianism and in the early nineteenth century there were enthusiasts, particularly among those interested in wild scenery beyond the reach of a wheeled vehicle. Among the stalwarts may be mentioned the Rev. Thomas Grierson, Minister of Kirkbean, who wrote a popular work on walking tours in Scotland. His advice could not have been followed by many although in his spartan efforts he was kinsman to those great equestrians Arthur Young and John Wesley : " As the very best advice I can give pedestrians, I would recommend early rising, and always turning over a good long stage before breakfast. This I never failed to do when a young man. . . . Fifteen or twenty miles before nine o'clock was my ordinary arrangement. This made the remainder of my journey comparatively easy. . . . Breakfast in such circumstances is doubly welcome. . . . These terms, combined with my long journeys, prevented others from being anxious to accompany me in my Highland expeditions." ¹⁷ There was still a certain contempt of the pedestrian, and surely this accounts for Grierson adding to his advice when he recommends for luggage " a large fishing-basket, covered with waxcloth, having the security of a padlock. This has a light and gentleman-like air with it, and if you carry a staff-rod, with a reel upon it, there is no saying but you may pass for a gentleman altogether, whose carriage and horses await him at the next stage " (p. 273).

By 1840 the revolution in transport was well started with the early trunk railways in operation and prolific schemes for extension. Already crack coaches were being transferred to minor roads and already there was a glamour coming over the dying road services. Men forgot the hardships, such as being roused at two o'clock in the morning to get a connection or of finding that all places were taken, and they looked with nostalgia to the past.

Outram Tristram quotes in his well-known and attractive volume on coaching an account of which one brief extract must suffice to show that travel by coach was not unalloyed bliss. " INSIDE—cramped

full of passengers—three fat fusty old men—a young mother and sick child—a cross old maid—a poll parrot—a bag of red herrings—double-barrelled gun (which you are afraid is loaded)—and a snarling lap-dog in addition to yourself. . . . OUTSIDE—Your eye cut out by the lash of a clumsy coachman's whip—hat blown off into a pond by a sudden gust of wind—seated between two apprehended murderers and a noted sheep-stealer in irons— . . . turned over— . . . head in hamper of wine—lots of broken bottles *versus* broken heads— . . . send for surgeon—wounds dressed— . . . take post-chaise—get home—lay down—and laid up.”¹⁸

Ruskin might declaim that he did not consider going by railroad as travelling and that it was merely being sent to a place as a parcel might be despatched, but the railway did allow multitudes to travel: at first with discomforts we would not now tolerate—badly sprung carriages, hard seats and no heating or lighting. As always, ‘experts’ appeared to tell people how to use the new service and the fifteen ‘Plain Rules for Railway Travellers’ promulgated by Dr Dionysius Lardner¹⁹ make in retrospect amusing reading as they show how people still thought by coach standards and the ordinary road.

“RULE III: Never sit in any unusual position or posture.” [Passengers are particularly warned not to put their leg out of second class carriages which have no doors.]

“RULE V: Never get out at the wrong side of a railway carriage.”

“RULE VI: Never pass from one side of a railway to the other, except when it is indispensably necessary to do so, and then not without the utmost precaution.”

“RULE X: Beware of yielding to the sudden impulse to spring from the carriage to recover your hat which has blown off, or a parcel dropped.”

By 1872 the transport revolution was nearly completed when the Midland Railway directors decided to include third-class coaches in all trains and thus opened speedy travel to all. When in 1678 a coach service for passengers was instituted between Edinburgh and Glasgow the scheduled time was six days, by 1750 this was reduced to 36 hours and by 1842, with the opening of the railway, to one hour and a half. In 1763 one stage-coach ran between Edinburgh and London and took a fortnight over the journey, but by 1835, the heyday of coaching, there were seven coach services which covered the distance in less than 48 hours and by 1849 the railway passenger who travelled first class took only twelve hours.

These improvements also affected continental travel: when, for example, Sir Robert Peel was summoned to London from Rome in 1834 he made a record journey of twelve days, thirty years later it took only sixty hours. No longer need a man spend months travelling on the Grand Tour for he could cover the ground in days. No longer could there be the same absorption of ideas from long contact with foreigners in their homeland but now multitudes could travel in place of few and the resultant impact was greater in that foreign travel now influenced a wider sector of the community. Encouraging these multitudes was Thomas Cook, who in 1841 organised the world's first

public railway excursion and fifteen years later announced his first 'Grand Circular Tour of Europe'.

To serve the growing market of tourism new guidebooks were prepared. The earliest rail route description I have come upon is in the seventh edition of Duncan's *Itinerary of Scotland* [1826], where among the road descriptions appears :

"No 159. *Kilmarnock to Troon by Rail Road* 9½ ml. OBSERVATIONS The Troon Rail Road rises about 80 or 84 ft. from Troon to Kilmarnock or 1-16th of an inch per yard. . . . Carriages made to run on the railway, pass once or twice a day to and from Troon, which has now become a fashionable sea-bathing town."

The observations also include an account of gentlemen's seats and noteworthy features. In an appendix is an account of the facilities for public travel on the Scottish canals. Such a layout for a guide could not be maintained as the railway network grew, although the Measom railway guides became oppressively voluminous in an attempt to be comprehensive, and the public favoured guides such as those of John Murray of London and Karl Baedeker of Coblenz. To supplement these were the timetables of Henry Bradshaw—both British and continental editions—which gave the precise information required as to how to make the journey.

So the nineteenth century wore on with apparently the rail to be ever paramount, but the road again exercised its attractions. With the invention of the safety bicycle there was once more an opportunity of travelling fast on roads with stops overnight where fancy ruled or a mechanical breakdown compelled. One reads with admiration of 'Nauticus' who rode a tricycle for 2,462 miles in Scotland and included in his itinerary of 69 days Skye and Cape Wrath.²⁰ One sympathises with his trials whether of road surface—the Peterhead-Aberdeen road he described as of "a loose surface through which the heads of large stones protruded" (p. 174)—or of accommodation—"I put up at the Caledonian [at Wick] but would advise the tourist to try the new hotel" (p. 153). 'Nauticus' certainly had highlights to remember and he rejoiced at Garve where his bill was :

"Tea (2 eggs, butter and jam)	1s : od
Bed, attendance and fire	1s : od
Breakfast (ham, eggs, jam, butter)	1s : od."

From the bicycle to the motor-car is a saga of the twentieth century as also is air travel, although both the new modes had their origins before 1900. On 7th January 1785 two voyagers rose in a balloon from Dover and four hours later landed in the Forest of Guines, but it was not until 25th July 1909 that Louis Blériot flew in 37 minutes from Calais to Dover on the first Channel crossing by aeroplane.

Perhaps a larger proportion of these travellers were bent solely on pleasure as the nineteenth century closed, but there still remained a nucleus who travelled with a view of personal enquiry, particularly in the realm of the field and social sciences. This type of enquiring traveller did not need the same type of handbook as had stimulated

the earlier travellers on the Grand Tour, and it is significant that Eustace's *Classical Tour*, in which moralising exhortations were as frequent as information, had its last edition in 1841. The tour of relatively few had become a trip participated in by many. Interests had changed in the two centuries and geographical texts had also altered. Patrick Gordon's work *Geography Anatomiz'd*²¹ may be compared with that of George Adam Smith's *The Historical Geography of the Holy Land*.²² The former gives as his description of the Dead Sea : "remarkable at present for abundance of Sulphurous Vapours which still ascend in so great a measure, that no Bird is able to fly from one side of the Lake to the other" (pp. 291-2). The latter for the same area writes : "These bitter and imprisoned waters, that are yet so blue and brilliant, chafe a low beach of gravel, varied by marl or salted marsh. . . . But the gravel is crowned with an almost constant hedge of driftwood, every particle of which is stripped of bark and bleached, while much of it glitters with salt. . . . If the coast is flat you have salt-pans, or a briny swamp, if terraced, there is a yellow scurfy stretch of soil, with a few thorn-bushes and succulent weeds. Ancient beaches of the sea are visible all round it, steep banks from five to fifty feet of stained and greasy marl, very friable, with heaps of rubbish at their feet, and crowned by nothing but their own bare, crumbling brows" (pp. 502-3). May not part of this change be attributed to the vivifying effect of travel and the consequent break from traditional styles which incorporated so much legend ?

Among the general works on travel are R. S. Lambert (Edit.), *Grand Tour*, London, 1935 ; J. A. Pimlott, *The Englishman's Holiday*, London, 1947 ; T. Burke, *Travel in England*, London, 1942 ; A. Stanley, *The Golden Road*, London, 1938 : for travel by coach, C. T. S. B. Reynardson, *Down the Road*, London, 1875, and W. Outram Tristram, *Coaching Days and Coaching Ways*, London, 1922.

¹ REES, T. *Journal of Voyages and Travels by the Late T. R.* London, 1822, pp. 1-3.

² KITCHINER, W. *The Traveller's Oracle or Maxims for Locomotion.* London, 1827, 2 vols.

³ [MILWARD, J.] *The Gentleman's Guide to his Tour through France, wrote by an officer in the Royal Navy* [1770].

⁴ JOHNSON, S. CHALMERS, A. (Edit.). *The British Essayists.* London, XXXIII, 1808, Nr. 97, pp. 335-8.

⁵ BERCHTOLD, L. *Essay to direct and extend the Inquiries of Patriotic Travellers.* London, 1789, I, pp. 98 and 425.

⁶ *A Provincial Scotsman. A Glance at London, Brussels and Paris.* Edinburgh, 1829, pp. 93-4.

⁷ *Annual Register for 1773.* London, 3rd Edition, 1789, Pt. II, pp. 178-80.

⁸ MORITZ, C., quoted in STANLEY, A., *The Golden Road.* London, 1938, pp. 488-9.

⁹ NUGENT, T. *The Grand Tour.* London, 1749, I, pp. 219-20.

¹⁰ *Ibid.*, I, p. 259.

¹¹ TRISTRAM, W. O. *Coaching Days and Coaching Ways.* London, 1922, p. 222 *et seq.*

¹² NUGENT, T. *op cit.*, IV, p. 42.

¹³ *Ibid.*, II, p. 313.

¹⁴ *Ibid.*, III, p. 382.

- ¹⁵ DOYLE, R. *The Foreign Tour of Messrs Brown, Jones and Robinson*. London, 1854.
- ¹⁶ J. M. *Travels of the Imagination: a true journey from Newcastle to London in a stage-coach*. London, 1773, p. 31.
- ¹⁷ GRIERSON, T. *Autumnal Rambles among the Scottish Mountains*. Edinburgh, 4th Edition, 1856, pp. 7-8.
- ¹⁸ Quoted TRIETRAM, W. O., *Coaching Days and Coaching Ways*. London, 1922, p. 373.
- ¹⁹ LARDNER, D. *Railway Economy*. London, 1850, pp. 333-47.
- ²⁰ NAUTICUS. *In Scotland*. 1882.
- ²¹ GORDON, P. *Geography anatomiz'd or The Geographical Grammar*. London, 4th Edition, 1704.
- ²² SMITH, G. A. *The Historical Geography of the Holy Land*. London, 1894.



"THE GREAT BRITON. As he stood contemplating the Rhine-land, wondering if it would be possible to live in that country; and considering, (supposing he had one of those castles now) how many thousands a-year one could do it with. The scenery would do; and with English institutions it might be made a good thing of."

Reproduced from *The Foreign Tour of Messrs Brown, Jones and Robertson*. Richard Doyle. London. Bradbury and Evans, 1854. P. 12.

THE ROADS OF SCOTLAND

I. ROMAN ROADS*

HORACE FAIRHURST

APART from the wide sweep of the modern arterial highway, the vagaries of the British road are a byword for inexplicable twist and unexpected dip and rise. This points back to a long past in which the shortest route between neighbouring towns was a rather secondary matter. Our road system originated so long ago that it would be gratifying to think of an unbroken link with prehistoric times. The Icknield Way, following the scarp of the Chalk from Salisbury Plain into East Anglia, and the Pilgrim's Way along the scarp of the North Downs, seem both to go back to the pre-Christian era. In Scotland, however, little is known of very ancient trackways and no clearly defined routes have been established. Doubtless some primitive trackways were in use, for trade, at least on a small scale, dates back to Bronze Age and even Neolithic times. The first roads in Scotland were built by the Romans, who introduced, in the space of a few years, a whole system in the south of the country.

The Roman road was constructed with a base of large stones upon which a convex mound of smaller stones and rubble was laid, the whole forming a distinct causeway about sixteen feet across. Crawford says, "It is that causeway which we follow across country when we are tracing the course of a Roman road".¹ He goes on to say that where it has survived to the present day, "This causeway merges almost imperceptibly into the ground on either side"² in contrast to original stretches of eighteenth-century roads which still have distinct edges; no earlier roads than these are likely to lead to confusion. Roman bridges in this country were of wood, with stone piers in some cases; so-called 'Roman bridges' are usually no more than two or three centuries old, and no original examples survive.

The scientific mapping of Roman roads and the forts and marching camps along them, commenced with General Roy in the eighteenth century. By the end of the nineteenth century, much had been written, but of a rather uncritical nature, and sceptics trimmed the earlier findings somewhat severely. Modern archaeological methods, and especially the use of air photographs, have changed the picture once more. A general review, such as this, must take into account a body of evidence, published in the last few years, which represents a most important contribution. Much is still problematical, as a glance at the accompanying map of the roads will show (Fig. 1).

It is tempting to the geographer to study the pattern of the roads as a system utilising obvious natural routeways. Such an approach over-simplifies the problem and is beset with pitfalls. The first roads were constructed by invaders working to a strategic plan, and the pattern was subsequently modified to suit the requirements of an

* It is hoped that this article will be the first of a suite dealing with the roads of Scotland at different periods.

occupying force. It is also to be remembered that the distribution of the native population was in all probability markedly different from that of later times ; while much of the Clyde-Forth lowlands seems to have been sparsely peopled, the frequency of occurrence of Iron Age forts in the Southern Uplands suggests an extensive settlement.

The invasion under Agricola in 80 A.D. is thought to have taken the form of a great pincer movement to envelop the Selgovae, a relatively powerful group living in the central part of the Southern Uplands.⁸ This movement would seem to have resulted in two roads crossing the Border country from the neighbourhood of Carlisle and Corbridge, and converging just east of the site of Edinburgh. The westerly route follows the general line of the present Carlisle-Glasgow road (A74), avoiding the low-lying ground along the Solway and also the river flats along the Annan. North of Moffat, however, the Romans left the valley, which becomes narrow, for the higher ground east of the Evan Water. The Upper Clyde was followed down to the Biggar district, and then the road diverged to utilise the easy passage-way along the south-eastern side of the Pentlands towards Inveresk.

The other arm of the pincer movement left the Tyne Valley at Corbridge in a northerly direction along the general line of the modern road to Edinburgh (A 68). The Romans, however, crossed into the Tweed Basin a little east of Carter Bar, on higher ground nearer the Cheviot (Pl. 3). Thence the road is aligned on the Eildons, passes the important fort at Newstead near Melrose, and continues up the Leader Valley towards Soutra. Its course beyond becomes doubtful, but almost certainly a fort at Inveresk was the terminus. Here, contact could be made with the Roman fleet, to which care of the east coast could be entrusted ; no road has been found along the modern east coast route from Berwick through Dunbar.

After the initial penetration, the Romans consolidated their hold on Southern Scotland. A temporary frontier was established by a series of forts from the Forth across to the Clyde, the forerunner of the later Wall. A road presumably ran from Inveresk through Cramond to this line, but the exact course has not been traced. From the fort at Newstead, a cross route of which only isolated stretches have yet been found, was constructed up the Tweed, and thence past Lyne, just west of Peebles, to another important fort at Castledykes, east of Lanark. A continuation westwards reached a fort at Loudon Hill in the uplands along the Ayrshire boundary, and may have terminated at a port somewhere near Irvine.

A third task in the consolidation lay in South West Scotland. A series of forts and marching camps along Nithsdale clearly indicates a road, but its course has not yet been traced ; it seems to have been linked by a road from Annandale which passed just north of Lochmaben while its northern continuation clearly led to the Clyde road south of Crawford. Evidence of a penetration further west has only recently begun to accumulate.

No mention has yet been made of the road from upper Clydesdale to the west end of the Clyde-Forth isthmus. This route has long provided a difficult problem for the archaeologists. A road undoubtedly

left Castledykes to follow the general route of the road from Lanark and the railway from Carstairs into Glasgow. All three utilise the higher ground east of the Clyde itself, whose flat-floored valley, liable



Fig. 1. Roman roads and forts north of Hadrian's Wall. All permanent forts which are known have been indicated, but only those referred to in the text have been named. Sites of marching camps are omitted, except for Glenmailen.

to flood, is bounded by steep sides downstream from the falls of Clyde. Traces of the Roman road have been found as far as Tollcross on the eastern outskirts of Glasgow; the course is thought to have led to a

fort at Balmuildy on the isthmus road at the Kelvin-crossing north of Glasgow.

So much has long been known, but no direct connection could be found southwards from Castledykes to the Annandale road. It was partly to meet this difficulty that the hypothesis was adopted of a pincer movement of the invading forces converging on Inveresk, while the lower Clydesdale road was looked upon as an offshoot to link with the west end of the isthmus forts. Within recent months, however, a report has been published of the discovery of the missing connection passing about two miles west of Tinto summit.⁴ An obvious anomaly in the pattern of the roads has been very satisfactorily removed, but so also has one of the main reasons for assuming the attractive hypothesis of an initial pincer movement converging on Inveresk. This must be left as a problem upon which the experts must be allowed time to meditate.

After consolidating south of the Clyde-Forth isthmus, Agricola continued his advance with the stated intention of subjugating the whole country. This forward movement resulted in the next road to be considered, which leads into Strathmore. Leaving from Camelon, near modern road and rail junctions, the Roman road has been identified almost into the town of Stirling; it avoided the badly drained carseland along the Forth and rounded the eastern end of the Campsies. Crawford, whose masterly survey is now being followed,⁵ believes that the Roman bridge over the Forth was actually at Stirling and not, as was formerly believed, near the bridge of the present Stirling to Thornhill road. The next section has not been traced on the ground, but the road must surely have proceeded up the only feasible route, that along Strathallan, to a fort at Ardoch. Thence the course follows the higher land north of the River Earn, to Perth, and then along Strathmore past Coupar Angus to the crossing of the River Isla at Cardean fort near Meikle. Here the Romans seem to have diverged from the modern main lines of communication by taking their road along the northern side of Strathmore, if the claim is substantiated that a section has been discovered near Kirriemuir.

This is the last trace known so far, and incidentally is the most northerly section of any Roman road. Several marching camps, including one at Glenmailen some eight miles east of Huntly, clearly indicate Roman penetration into Aberdeenshire and possibly beyond. There is no evidence, however, of any invasion of the Highlands; they seem simply to have been cordoned off, to use Steer's expression, by forts at the main valley exits—those of the Teith, Earn, Almond and Tay—and the connections with the main road of these outliers may never have been completed.

Agricola's recall to Rome cut short his incursion into the north-east; his conquests were held until about the end of the first century when the 'Flavian' period came to an end in a withdrawal from Scotland. Subsequently, Hadrian's Wall was constructed from the Solway to the Tyne as the northern limit of the Empire. A re-advance took place about 142 A.D., and the succeeding 'Antonine' period lasted for about forty years.

From the present point of view, the main feature of the Antonine period was the construction of the Wall across the Clyde-Forth isthmus. It was built for the most part of turf on a stone foundation, with a ditch on the outer side and a road immediately behind to connect the series of forts spaced at intervals of about two miles. The Wall and road commenced in the west at Old Kilpatrick; it is interesting to note in passing that this position did not command the lowest crossing place, for the Clyde estuary was fordable at low tide further down at Dumbuck. On its way eastward, the line of the Wall was determined not only by tactical considerations in relation to the country to the north, but also by the need to follow an easy route for the road. The course at first runs inconveniently near the Kilpatricks, but soon diverges across a succession of low hills—drumlins—to the Kelvin-crossing at Balmuildy. Then the southern side of the remarkable east-west trough of the Kelvin and the Bonny Water was utilised, with a clear though not very distant view northwards across to the Campsies. Beyond Falkirk, the low-lying carseland along the Forth was left outside the frontier; the last station was reached at Carriden on the estuary north-east of Linlithgow. No important through route follows this relatively easy passage at the present time, as it lies obliquely in relation to the Glasgow—Stirling—Edinburgh triangle.

The isthmus road completes the pattern of the Roman roads in Scotland, in so far as it is known at present. The isolated section shown on the map as running north-eastwards from Raeburnfoot into the basin of the Borthwick Water, a tributary of the upper Teviot, suggests further research along this alignment. There has also been much speculation about a possible road from Castledykes passing through the Airdrie district to Castlecary, on the east-central part of the Wall.

Surveying the pattern as a whole, a resemblance is apparent between the routes of several of the main Roman roads and some of our modern lines of communication. The present road and rail routes from Carlisle to Glasgow, passing through Lanark or Carstairs, are rarely far from the ancient road. Similarly, there is a broad correspondence along the route through Stirling into Strathmore. The modern road from Edinburgh south over Carter Bar (A 68) recalls the route of the Roman highway down Lauderdale and across the Border country.

It is obvious that the Romans selected their routeways in relation to the lie of the land, with a most remarkable skill. Their limitations, however, were different from those accepted in modern times. While the gradients were not necessarily so low as those of the railway or the recently engineered highway, the ancient roads had to avoid passing under steep slopes where ambush might be feared. Similarly, a more commanding position on higher ground might be chosen in preference to an alternative lower route; there is a good example of this in the case of the ridge to the north of the lower River Earn, where a series of signal stations have been discovered along the Roman road. Even so, close study of the exact position of the Roman roads reveals a divergence between old and new which is so common as almost to be

constant. The correspondence noted above is therefore general, but only occasionally precise.

The explanation is fairly clear. The Roman roads were not maintained after the general withdrawal about the end of the second century; wooden bridges particularly must have deteriorated rapidly and, even if a road continued in use, fording places would have to be found and diversions would be inevitable. In general, at this stage of development of the native population, there was little use for long-distance routes and almost certainly many of them were superfluous. This is most obvious in a case such as the road from Loudon Hill eastwards. Perhaps other routes were more frequented; the elongated Kingdom of Strathclyde from Dumbarton to the Cumbrian Hills must surely have depended during the Dark Ages upon inter-communication along the general line of the Roman route, and it might be suggested that the cohesion of this native state was easier because of an established road. But in general, the long distance traffic ceased, and only by local accident did the Roman road continue in use into medieval times. The modern roads A 74 and A 68, crossing the Border where the Roman roads had gone before, run as straight as the ground will allow towards Glasgow and Edinburgh respectively, which by a co-incidence in both cases, have grown up almost on the direct line from the Roman stations at Carlisle and Corbridge to the two ends of the Antonine Wall.

From the point of view of the development of the modern system of communications, the Roman strategic roads were a premature introduction, and had very little effect on the course of later long distance highways.

NOTE

A brief note may be added for those who wish to follow on the ground the course of the Roman roads. K. Steer, 'Roman Scotland', *Scottish Historical Review*, 1954, gives a concise survey from the archaeological point of view; his maps form the basis of Fig. 1. Sir George Macdonald, *The Roman Wall in Scotland*, 2nd edition, 1934, is a detailed study and a classic. O. G. S. Crawford, *The Topography of Roman Scotland*, 1949, is primarily concerned with the details of the road into Strathmore, but the general introduction is invaluable. *The Roman Occupation of South West Scotland*, edited by S. Miller, 1952, gives full details of roads, with a most commendable series of large scale maps. Jessie Mothersole, *Agricola's Road into Scotland*, is a popular account of the country traversed by her from the south to Newstead.

¹ CRAWFORD, O. G. S. *The Topography of Roman Scotland*. P. 4.

² *Op. cit.*, p. 5.

³ STEER, K. Roman Scotland. *Scottish Historical Review*, 1954, 33.

⁴ RALEGH RADFORD, REID, ROBERTSON, and TRUCKEL. Roman Roads in S.W. Scotland—from Castledykes to Crawford. *Transactions of the Dumfries and Galloway Natural History and Antiquarian Society*, 1952-3, Third Series 31, p. 30.

⁵ CRAWFORD, O. G. S. *Op. cit.*

CHANGING LANDSCAPE AND SOCIAL STRUCTURE IN SCOTTISH LOWLANDS AS REVEALED BY EIGHTEENTH-CENTURY ESTATE PLANS

BETTY M. W. THIRD

Based on a paper read to Section E of the British Association, Liverpool. September 1953.

EIGHTEENTH-century improvers in lowland Scotland were frequently faced with the task of consolidating scattered individual possessions before they could proceed with enclosure. In the regions of Angus, Clydesdale and Lothian, under consideration, these possessions were said to 'lie runrig'. It is clear, however, that although the rigs of the co-tenants of a farm might still be intermixed, the spirit and essential purpose of runrig as a working system of co-operative husbandry had been lost. There was no longer insistence on meticulously fair division of land among co-tenants, and the original frequent re-allocation of possessions to preserve a just distribution had ceased. An extract from the estate records of the ducal family of Hamilton may serve to illustrate the extent to which runrig had become an outmoded institution by the middle of the eighteenth century.¹ In 1766, when the enclosure of the Duke of Hamilton's Clydesdale Estates was proceeding, the Duke's factor met one day with the eight tenants of a large farm in the hope of effecting an agreed consolidation of their several runrig possessions. The incident was recorded in the estate journal with this observation: "We traversed, pitted and deliberately considered every soil in each man's possession: and find their predecessors have been at great pains in giving every man his share of each field, what they thought good or bad or indifferent; their even dividing riggs being a demonstration of this". In 1766 the tenants possessed unequal shares of the farm, paid each a different rent per acre, and regarded their fixed possessions, held on individual lease, as so many farms within the larger farm unit. So little were they bound together by ties of mutual reliance and friendly co-operation that the factor found them highly obstructive one to another, and declared that their contentions frustrated his whole scheme for improvement.

Such a state of affairs was by no means confined to the Hamilton Estates in the eighteenth century. Part-time smallholders such as Angus weavers might find it necessary to unite to form a plough team but most tenants who shared farms held their possessions in fixed portions which they worked independently, while many farmers were the sole tenants of their consolidated farms by the middle of the century. Where fixed possessions still lay runrig, it seems that runrig proximity fostered a jealous sense of personal rights: endless bickerings and disputations contributed not a little towards the backward condition of agriculture.

Numerous rentals of the seventeenth and eighteenth centuries, showing money payments in Scots currency and the old traditional payments of rent in kind, furnish proof that the equalitarian runrig

community did once exist. The gradual process that led to the breakdown of the system, giving rise to the individualistic farmer and to the wealthier and the less substantial tenant, was the most fundamental

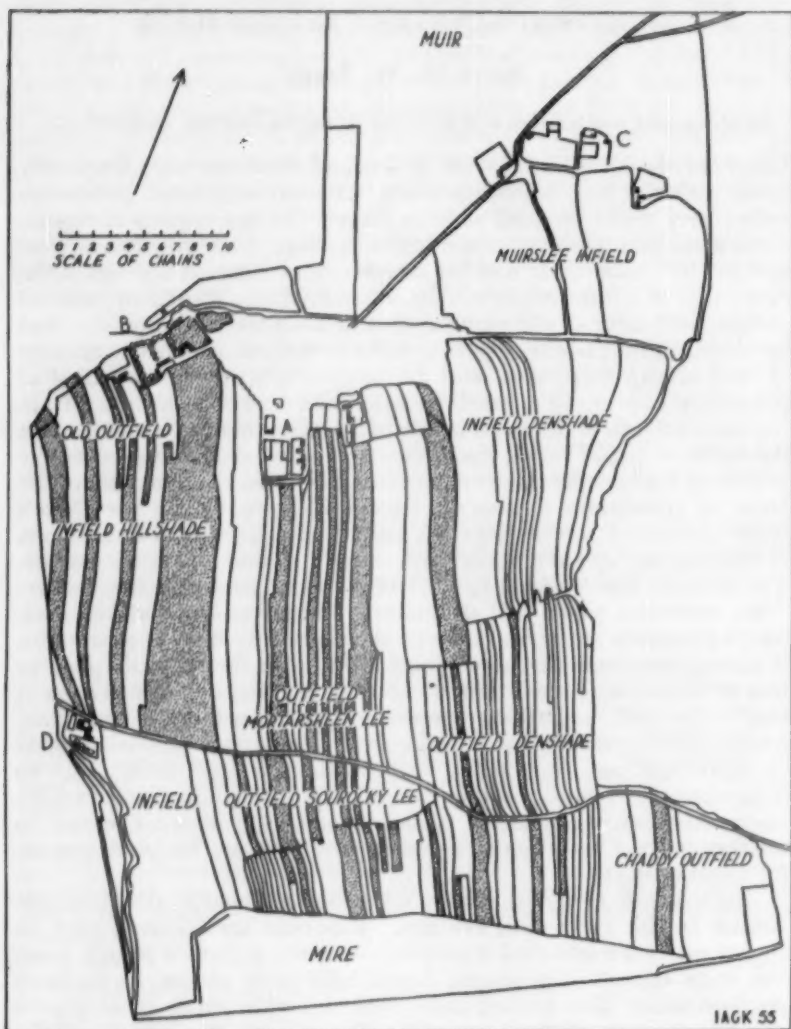


Fig. 1. Auchindory Farm : Airlie (37/365516) : 1773.

Stipple indicates one tenant's holding.

change that took place during the runrig period. The trend that gave impetus to the Agricultural Revolution thus began long before its inception, but became greatly accentuated as the revolution proceeded. Throughout runrig times it was reflected on the actual landscape in the

growing size of the individual rig, and in the tendency for the farm hamlet or 'fermtoun' to split into individual, scattered steadings. During the enclosure period the varying wealth of landowners and tenants alike showed conspicuously in the progress of enclosure and improvement, in the general efficiency of execution, and in the gradual acquisition by the more prosperous farmers of additional lands. It is intended here to illustrate various stages of this movement in runrig times and during the enclosure era, and to show the extent to which geographical factors influenced the process of evolution. This theme alone has been selected for illustration because, apart from the fact that the estate plans depict merely eighteenth-century conditions (generally pre-enclosure), it is doubtful whether the landscape changed much in its more obvious aspects during the medieval period. The Scottish farmer clung to his traditional type of husbandry and made little effort to dominate his terrain.

The plan of Auchindory Farm (Fig. 1), which lies near Kirriemuir in Angus, shows the excessive fragmentation of possessions that almost inevitably occurred when a farm became overloaded with tenants during runrig times. Various stages in the counter-movement towards consolidation and fixation of possessions may also be seen. Here eight tenants possessed, in varying acreages, a hundred and thirty-six arable acres that lay in a hundred and fifty-four parcels, the smallest possession being a portion of a rig amounting to a fortieth of an acre. This fragmentation had been even more excessive, because obvious efforts had been made to amalgamate rig possessions, both lengthwise and laterally. The common practice of combining two or three blocks of rigs, joining rig-end to rig-end, which may have been the first kind of amalgamation practised, had been adopted. A number of the smaller rigs shown amounted roughly to a rood or quarter of an acre, and the larger rigs which the tenants straightened and combined lengthwise in groups were each about two or three times that size. With this type of amalgamation it was possible to maintain equality of possession, and it seems that the tenants at first made an effort to do so. Inequalities came about when they began to combine adjacent rigs into fixed possessions. This possibly began at the period when two of the four principal tenants moved from what the plan shows to be the original fermtoun (*A*) to a new site a short distance from it (*B*). They proceeded to turn what had been outfield into improved and continuously-cropped infield, and held this section of the farm in alternate shares, some of which included a few rigs combined laterally. Thus a limited kind of runrig took the place of the previous complete intermixture of possessions and prepared the way for the fixation of holdings.

The plan of part of Longniddry Barony (Fig. 2) shows a further and more usual stage reached in the process of consolidation and fixation by the eighteenth century. Here, most of the possessions lay in compact blocks of rigs, in the nature of large fields, with a limited degree of runrig intermixture. The principal tenants held blocks of possessions, disposed roughly in divisions lying at right angles to the main street of Longniddry, and on either side of each respective tenant's steading. The tenant with the largest share held a block of what were termed

'Inclosures', but still had a section of his land lying runrig with holdings of the village cottars. Since this type of farm was common in fertile districts, it was possible for the more progressive tenants to prosper increasingly, but since the farmland was worked by a large community it was difficult to acquire completely consolidated holdings.

The manner in which consolidation of possessions was accomplished and the amount of success that met efforts to achieve unified farms

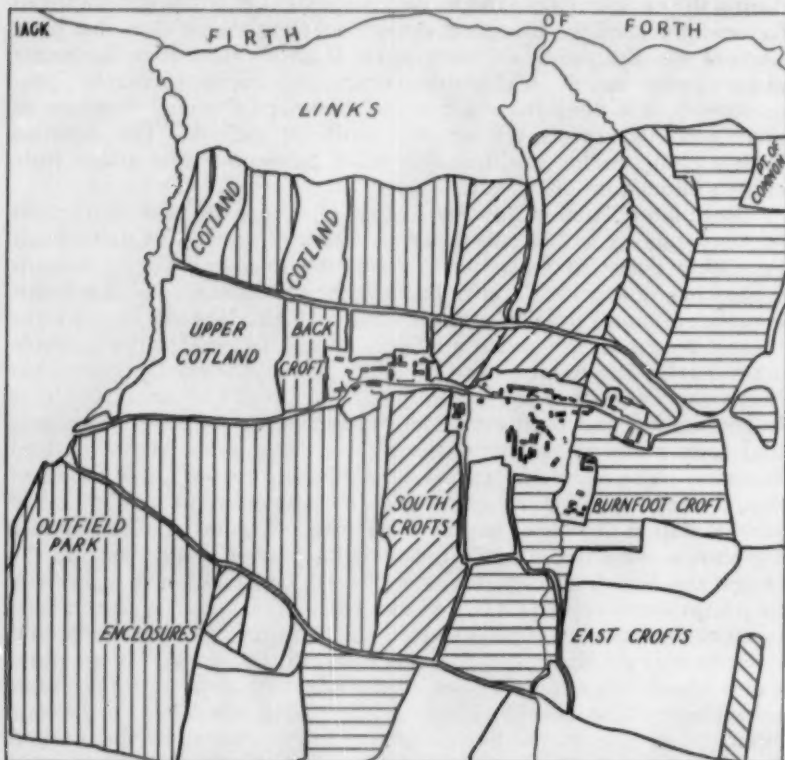


Fig. 2. Longniddry Barony: Gladsmuir Parish (36/4476): 1778.
Rulings distinguish four tenants holdings.

varied considerably as between two distinct types of farm, each of which followed a different line of development. The first was the large compactly-shaped farm with a single, centrally-situated fermtown. Such was Longniddry. This type varied in size in all three regions from two hundred and fifty to seven hundred acres, and was found on surfaces of slight relief, whether coastal or alluvial lowlands, or erosion surfaces up to about five hundred feet in altitude. It was prevalent in East Lothian, in the districts around Coupar Angus and Montrose, and on lowlands on lower Clydesdale. The land was inherently fertile and sufficiently easy to drain for the common mosses or muirs, which

controlled the development of the second type, to be non-existent or insignificant. Usually a large and prosperous fermtoun was to be found centrally-situated in the extensive arable lands. When the several possessions of the tenants came to be consolidated, it was not easy to secure undivided holdings each with its own steading, and sometimes blocks of possessions lay awkwardly in runrig fashion until the enclosure era. Estate factors, surveyors and advisers, faced with the division and enclosure of these large farms, frequently had to contend with as many as seven or eight separate shares lying runrig.

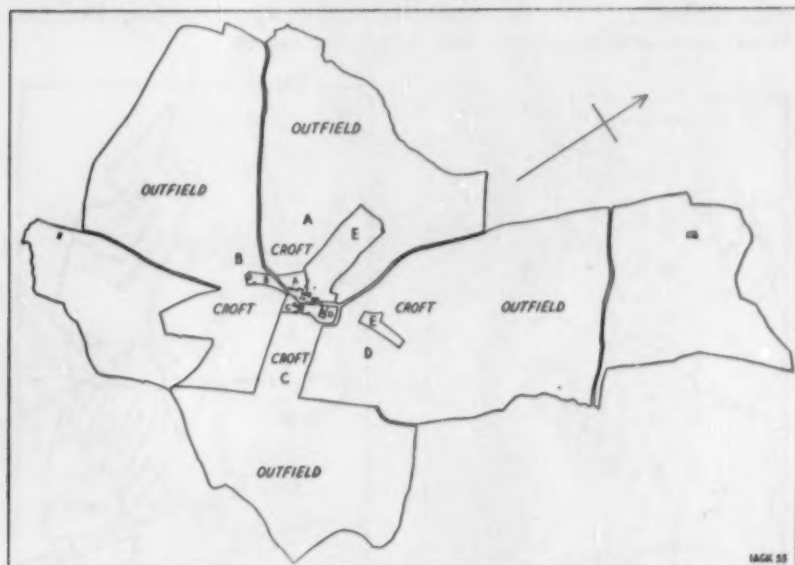


Fig. 3. Draffen Farm : Lesmahagow Parish (26/795454) : c. 1770.

The farm of Draffen (Fig. 3) affords an example of an early rational division of such a farm into wedge-shaped units, by lines radiating from the fermtoun. Thus each of the principal tenants of this farm of six hundred and eighty-four acres was given a share of both infield and outfield, his steading remaining within the fermtoun. This type of farm usually preserved its unity throughout the runrig period, the fermtoun often growing to village dimensions. The town of Penicuik in Midlothian had such an origin, and farm villages rather than hamlets were found near the river in lower Clydesdale, and in Strathmore.

The second type, the strip farm with frontage on a common muir, was most typically found on a slope, and in its development was dominated by the common muir. Besides supplying essential summer grazing for cattle, the common muir and mosses provided for the elemental needs of a roof of turf, sometimes walls of the same, and a fire of peat,

turf or whins. The recognised value of possessing even a limited frontage on a common and thereby acquiring rights over it, determined the alignment of adjacent farms and the method of farm division. Strip farms resulted which often ran from a narrow frontage on a river or common meadow up to the common muir. These were most prevalent on lands marginal to extensive moorlands. They lined the sloping edge of what has been termed the Upper Lowland Peneplane, in Clydesdale and Lothian, ran from riverside to moorland ridge in the Howe of Angus, and were found fringing the Highland Edge and lower slopes of the Lothian hills. Groups of such farms may be seen on the plan of Douglas Estate in Clydesdale (Fig. 4) stretching from Douglas Water or near it to common muirs or hill grazings.



Fig. 4. Douglas Estate: Douglas Parish (26/8736): 1769.

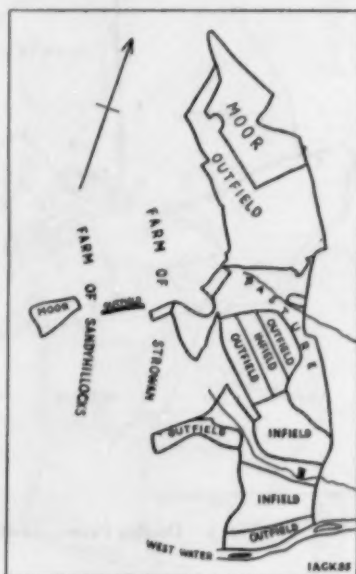
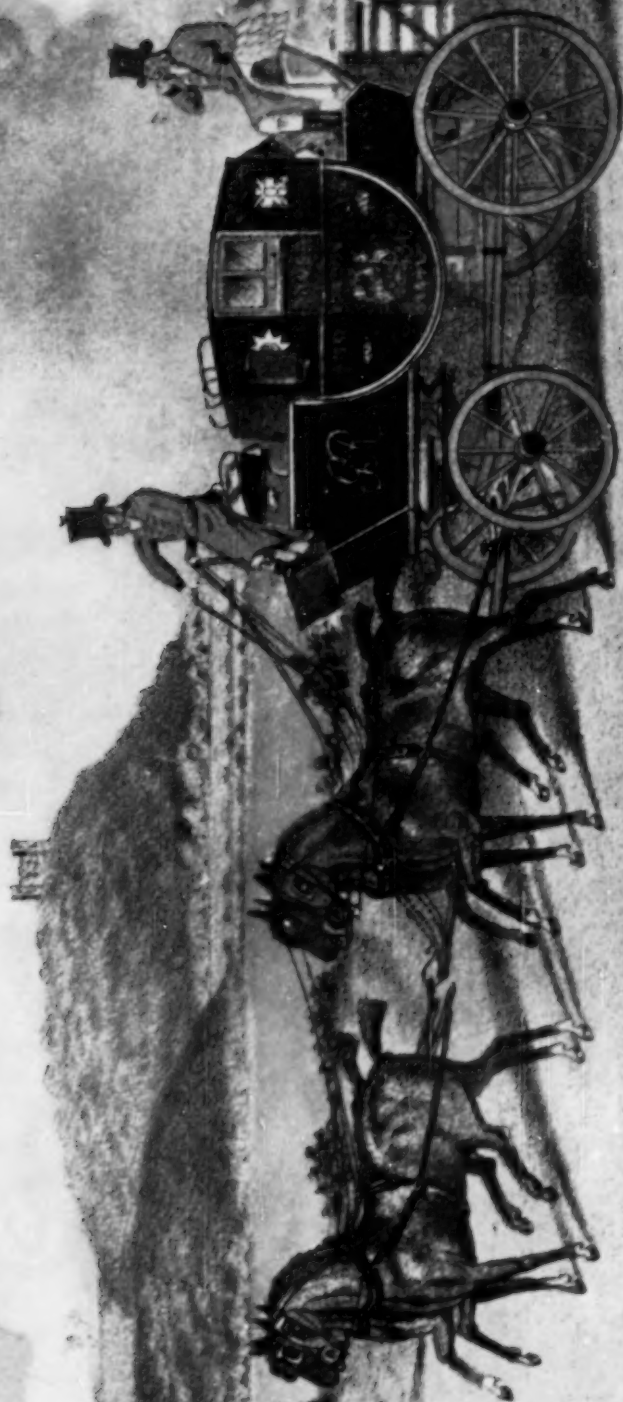


Fig. 5. Burnroot Farm: Edzell Parish (37/617662): 1766.

The significant position held by the common muir in the farm economy was frequently reflected in the siting of the fermtoun close to the muir, to which it was connected by a loan or farm track. When the farm community no longer worked in close co-operation and individuals began to seek their own fixed possessions, they split the farm lengthwise in order to preserve a frontage for each. In this manner strip farms might become extremely narrow. Sometimes the line of division passed through the fermtoun, but more frequently the community dispersed, each tenant to a steading on his own strip.

The farm of Burnroot (Fig. 5) was a strip farm stretching from the West Water near Edzell to a section of common muir. This farm had



PL. I (see p. 69). SCENE ON THE DOVER ROAD

The Mail of the Olden Day in the reign of George the Third. Reproduced from *Down the Road*, C. T. S. Birch Reynardson, London : Chapman and Hall Ltd, 1887. *Fontispiez*.

LANDS OF PITMOUSE



TO ENCLOSURE AND IMPROVEMENT

... site of 'Wauk miln' (fulling mill) and its lands in north-eastern section of plan. ... from the poor moorland grazings of the home farm (Mains of Friack) whose steading ... and outfields (periodically cropped land) are shown. Note irregular fields ('shade', ... cutting onto moorland; farm track cutting across rigs; peripheral meadow, haugh and ... original plan 20½ x 15½ inches; scale approximately ¼ Scotch statute chains to an inch.]



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PL 3 (see p. 78). DERE STREET CROSSING THE CHEVIOT HILLS

This air photograph, selected by Dr J. K. St Joseph from the Aerial Photography Library, the University of Cambridge, shows the Roman road running in a north-westerly direction across the bare hills of the Border between the Cheviot and Carter Bar (36 788109). Along the eastern edge of the road (on the right in the photograph), there are to be seen the gravel pits used when the road was under construction.

been formed by the process of longitudinal splitting but still had attached to it small possessions in two neighbouring farms. What had been one fermtoun and farm had become three farms each with its own steading. After subdivision these strip farms were often less than fifty acres in extent, and did not survive the enclosure movement.

To summarise so far, it may be said that the strip type of farm facilitated the development of individual farms many of which were small and afforded a bare living, whereas, until the enclosure era, the large compact type of farm shared by a number of tenants was seldom divided into self-contained units but afforded opportunities for the more successful and prosperous tenants to acquire gradually the holdings of poorer tenants whose lands lay runrig with theirs. Thus the wealthy farmer who could afford to pay the excessive rents charged during enclosure times came most frequently from the latter type of farm.

"To him that hath shall be given" applied most forcefully during the enclosure era, the possession of capital being a vital factor in determining the progress and manner of enclosure. The amount of available capital naturally depended to a considerable degree on the fertility and extent of land possessed. In each region, it was the powerful and wealthy landowner with extensive well-situated estates who was able to employ expert officials, overseers and large labour gangs, and thus made the most conspicuous progress. He could attract progressive tenants and effect improvements in a manner and on a scale that lesser lairds could not emulate. Although lairds of a number of small estates in fertile districts made early progress with enclosure from 1720 onwards, what may be termed the general enclosure and improvement of the lowlands of each region did not begin until the years between 1765 and 1775. At that time, encouraged by the Act of 1770 which facilitated the improvement and enclosure of entailed estates, a number of the great landowners in each region commenced widespread enclosure operations which greatly increased the regional momentum. This striking coincidence in timing, in three widely separated lowlands, and the assumption of the leading role by the great landowners, doubtless reflects the distinct advantages each region had to offer the would-be improver, but also demonstrates the importance of wealth as a factor in determining the progress of improvements. Although it is true to some extent that the new doctrines of the Agricultural Revolution were practised first in the Lothians, it is doubtful whether the commonly expressed opinion is valid that Lothian was ahead of other lowlands of Scotland as regards the progress of improvement. The nobility of Clydesdale and Angus were frequently as conversant with Englishmen and their methods of agriculture as were those of Lothian, and most were members of the Edinburgh Society of Improvers. Certainly it has been established that foremost improvers in Clydesdale, with the advantages of plentiful and cheap coal and lime, an excellent labour supply and a ready market, or in Angus with almost as great advantages, did accomplish the general enclosure of their lands as early, and as well, as the leading East Lothian improvers, for all the excellence of that county's climate and soil. The general

enclosure and improvement of lands on the Upper Lowland Peneplane lagged a quarter of a century behind that of the lowlands in spite of the initiative and enterprise of lairds such as Sir John Clerk of Penicuik. Here lack of capital was a decided handicap.

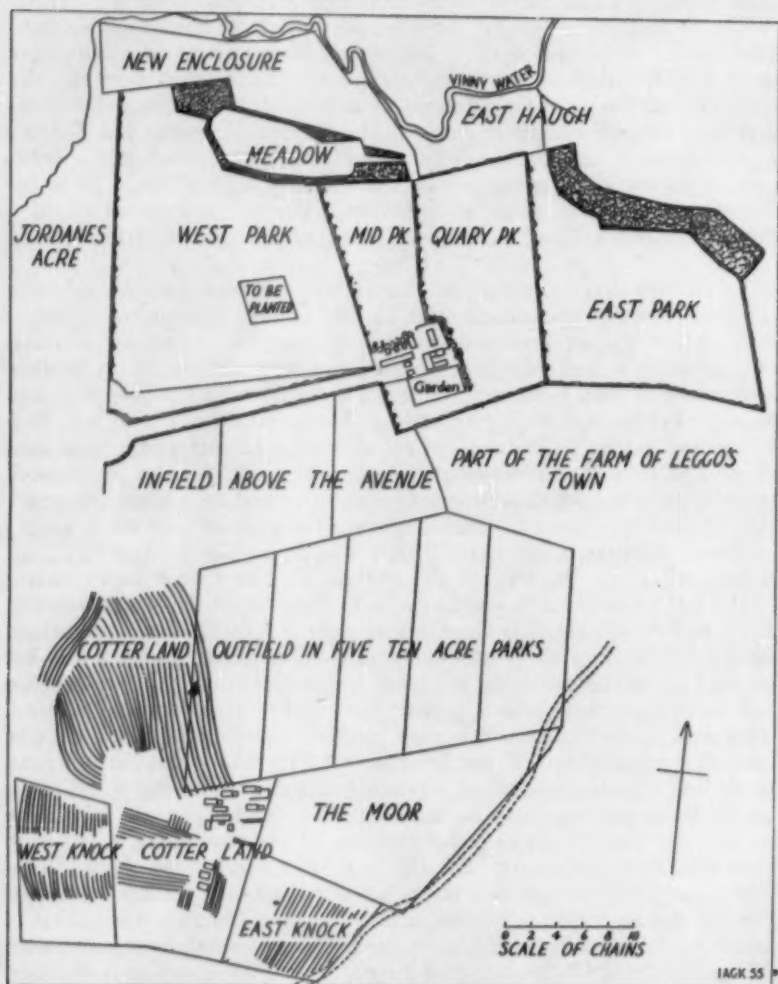


Fig. 6. Mains of Middleton: Kirken Parish (37/583487): 1756.
Disposition of rigs on cotter land indicated.

The following text-figures show development characteristic of these three phases of the enclosure movement: first, the stages by which small estates were enclosed in the early period; second, the widespread and efficient improvement of the estates of the great landowners; and third,

the more gradual and halting improvements of higher and more remote lands.

In the first period, between 1720 and 1760, a number of moderate or small estates on fertile lowlands were improved and enclosed by progressive lairds such as wealthy Glasgow merchants who regarded improvable estates as investments, professional gentlemen holding public posts in Edinburgh or London, and lairds who belonged to local societies of improvers. At this early period these estates must have presented trim and outstanding spectacles of hedge and tree enclosure, straightened rigs, and improved land. Their owners could not always achieve an even spread of improvement, and might remain content with the complete enclosure and improvement of the policies and home farm, leaving the completion of the rest to tenants. Mains of Middleton at Friockheim was enclosed in stages in this fashion, the enclosure of the home farm being complete by 1756 (Fig. 6).

The second period, between 1760 and 1800, witnessed the transformation of the lowland landscape, and the expenditure of vast sums of money on improvements by the great landowners. Teams of estate officials organised simultaneously the enclosure and improvement of extensive baronies. With the aid of overseers and labourers, they undertook the major works of improvement and exercised strict vigilance over the activities of their tenants. Thus it was possible to maintain uniform efficiency and adhere rigidly to current doctrines and theories. The plan of Hamilton Barony (Fig. 7) shows a grid of rectangular enclosures being laid out by the Hamilton Estate officials on either side of the new turnpike road between Hamilton and Ayr. They took great care over the approved rounding off of corners with trees, but it may be remarked that in their desire to maintain regularity they showed little regard for the courses of streams or the position of farm steadings and cottages. The estate records of such families as the Hamiltons and the Bowes-Lyons of Glamis show that it was customary for gangs of as many as a hundred labourers to be employed on such tasks as making sets of enclosures and straightening rigs—a costly process that ruined many improving tenants. Such gangs would plant thousands of trees in one operation, make roads and bridges and construct farm houses and offices. Naturally, wealthy and progressive tenants were attracted to such estates. Although most factors appreciated the advantages of having a large number of small tenants and seldom pursued any deliberate policy of evicting the small farmer, the system of rousing, or letting farms to the highest bidder, enabled wealthy incomers to displace poorer tenants. Thus came about rising rents and rapid improvement.

The third period, from 1800 to 1820, saw the general improvement of estates lying above six hundred and fifty feet in altitude by lairds who were hampered by poor terrain, transport difficulties and low financial resources. Poor rents from marginal land, scarcity of labourers and a lack of enterprising tenants did not permit large-scale improvements and rapid change. Early efforts at enclosure were therefore conspicuously halting and tentative in nature. Some plans, such as that of Uddington (Fig. 8), show the continuance of runrig

influence into the enclosure era in that enclosures were long, rectangular strips apparently formed by the straightening and consolidation of rigs. These enclosures were shared in alternating fashion by the farm tenants. Although enclosures made in this fashion might not present the regular appearance of those made by teams of experts nor conform so well to the new theories of husbandry, they sometimes appear to have been adapted to local terrain. Runrig practices and perhaps also the spirit of good neighbourhood lingered on these estates.

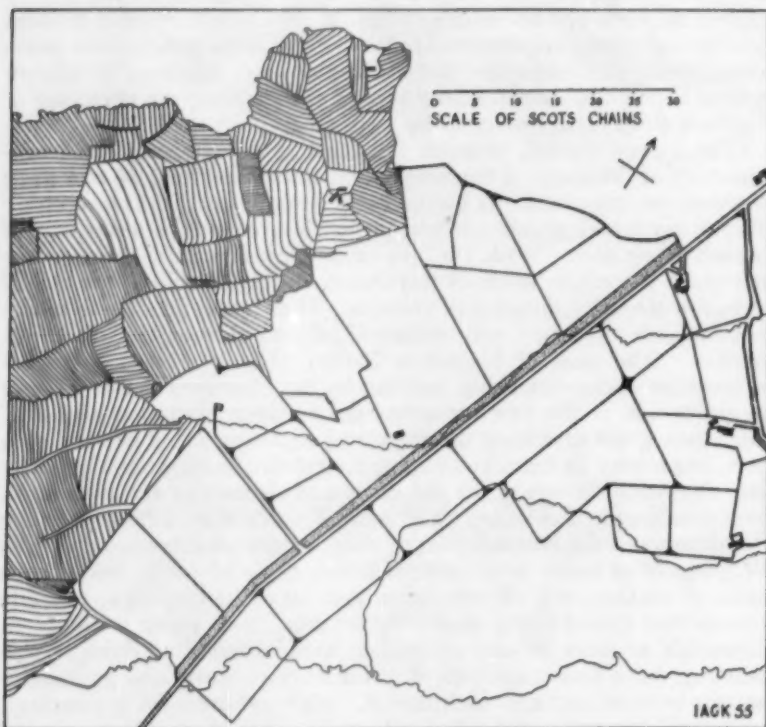


Fig. 7. Hamilton Barony : Hamilton Parish (26/7152) : c. 1770.
Disposition of rigs in old fields indicated.

Conclusion

These findings have emerged from the study of three hundred and fifty estate plans (see Pl. 2) and associated documents. The plans have also been catalogued and classified, the catalogue being retained in the Edinburgh rooms of the Royal Scottish Geographical Society for the use of interested persons.

The Angus plans demonstrate well the effect of a fluctuating and predominantly increasing population in upsetting the balance of the

runrig system and causing fragmentation of possessions. The full implications of this are, however, beyond the scope of this paper. The plans show how the runrig community through its very zeal to give every man his share brought about excessive fragmentation which provoked the counter-movement towards consolidation, fixation and the development of most unequal shares. Geographical factors played an important part in determining the extent to which consolidation of individual possessions was effected by the end of runrig times; on these factors also depended to a considerable extent the emergence of the wealthier tenant farmer. We have seen that the enclosure era

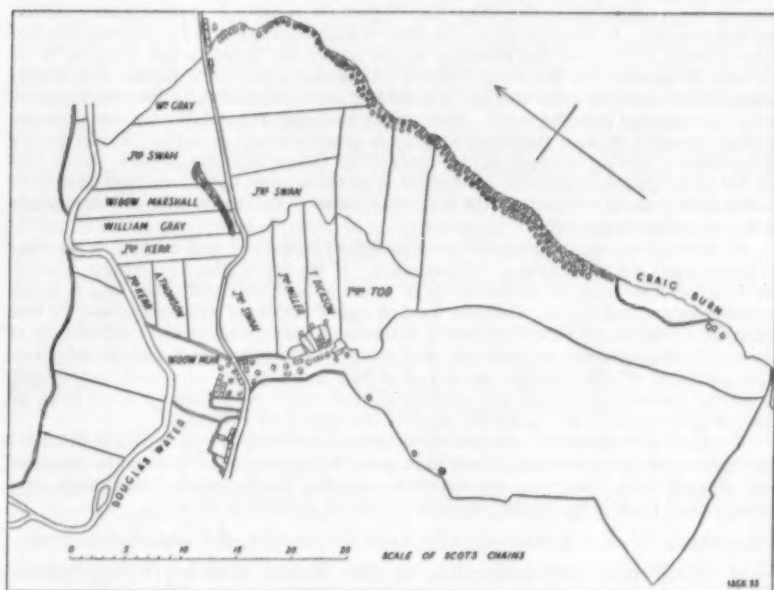


Fig. 8. Uddington Farm: Douglas Parish (26/863334): 1804.

witnessed the triumph of rich landowner and tenant alike and the gradual extension by them of their lands.

The human element must not, however, be forgotten. Estate plans drawn in the early nineteenth century show that even the most fertile lowlands must then have presented a landscape of striking contrasts reflecting varying degrees of enterprise. Adjoining lands under different ownership showed the old and new in close proximity. On one hand lay an irregular pattern of high crooked rigs scarcely altered since the earliest days of runrig, and on the other a chequerboard of enclosed fields forming a pattern that typically was more rigid and formal than that which remains today.

¹ *Hamilton Estate Journal*, 1766, entry February 1 re Hallside Farm, Cambuslang parish.

WHAT ARE THE LIMITS OF POSSIBLE AFFORESTATION IN SCOTLAND?

A symposium, sponsored by Mr R. K. Martin (Technical Officer, Co-operative Forestry Soc. (Scot.) Ltd) for the Royal Scottish Geographical Society's 'New Developments' meeting, held in the Society's rooms on Thursday 3rd March 1955.

CHAIRMAN: MR A. R. WANNOP, O.B.E. (*Director, Hill Farming Research Organisation*):

This subject of the limits of possible afforestation in Scotland is as important as any we have discussed in the 'New Developments' series. It is an urgent question for two reasons. In the first place, the rate of acquisition of land for afforestation has been slowing down and the post-war target set by the Government is going to be difficult to attain. In the second place, we cannot afford as a nation in a highly competitive world to have any land, whatever its classification, utilised inefficiently from the national point of view. Most of the land that is available for tree planting is rough grazing or poor grassland at present grazing sheep or cattle. Undoubtedly this creates a conflict between the interests of the farmer and the forester. Both find the better rough grazings more productive than the poorer, but as we must have both timber and meat, it is essential that the two interests work as harmoniously as possible rather than in antagonism.

In striving to obtain maximum production of both food and trees, it is essential to know what are the limits to afforestation. If we could plant to greater heights, we could reserve more of the lower rough grazings for cattle and sheep and so make better-balanced hill farms wherever land is being allocated to farming and to tree planting. Further, it would permit a better and more widespread distribution of trees with the benefits in drainage and rural employment that this would have. The problems of afforestation as well as of hill farming are, of course, not merely technical, but equally social and ecological, and unless we approach them from all these angles we shall not make the most of our country's resources.

To open this discussion the Society is more than fortunate in securing Professor Anderson and Mr Edwards. Both have a wide experience of forestry in Scotland and abroad, both have been concerned in studying the factors that encourage tree-growth, and both bring to the problem a critical attitude of mind.

PROFESSOR M. L. ANDERSON (*Professor of Forestry, Edinburgh University*):

I think that the enterprise of the Royal Scottish Geographical Society in staging a discussion upon afforestation is greatly to be commended, and I regard it as a great honour to have been asked to open this meeting.

The first thing I have to do is to flirt with a few definitions, and in doing so I shall endeavour to narrow down the issue from its rather broad terms. First, I would like to state what I believe the term 'afforestation' covers. Afforestation in the true sense means the creation of forests. We must ask ourselves then why we should wish to create forests. It is generally recognised that forests or woodlands can be of value to man first in their protective capacity, next in their productive capacity and lastly in other minor capacities, such as aesthetic, recreational and educational. We could, therefore, wish to create forests for any one of these reasons or for a combination of two or more of them. It would restrict our discussion very much if we were to omit all types of forest other than that which produces raw materials for industrial purposes, and it would be very wrong to do so.

I admit that the purely productive forest is probably the only type

of useful forest for which any economic measure is applicable. Even, however, in this case, owing to the very long time between establishment and maturity, and to the instability of money as a measure of economic efficiency over any period of time exceeding, for instance, ten years, it is extremely difficult indeed to use financial calculations to determine the limits of economic afforestation. Money as a measure of economic efficiency is almost useless in forestry, because it changes in value between the time of planting and the time of harvesting.

We do know, however, that with the present high costs of establishment and tending and the falling prices obtainable for timber there are very few areas indeed, in Scotland, which hold out prospects of profit when afforested, no matter how low a compound interest rate is charged on the capital invested. We are in fact presented with the anomaly that afforestation is economically possible—from the orthodox viewpoint—only on land which should be turned over to other land-uses, and in particular food production. We will all agree that it is the very opposite state of affairs that is desirable, namely, to create our forests on land which can produce timber or where the forest can fulfil other useful purposes but which is uneconomic for food production. I have for long realised that it is, generally speaking, uneconomic to afforest such areas, because the rate of production is far too slow to pay interest on the amount of capital which has to be expended to create the forests in question.

When, however, we accept that it is not the creation of forests but the re-creation of former natural forests, indiscriminately destroyed in the past, which is the real object of afforestation in Scotland, then we can quite reasonably turn to the common exchequer and say: "It was very wrong of your former controllers to allow the final devastation of our former forests. It is going to cost a great deal of money to replace them. Your predecessors transferred capital out of former forests and in the process destroyed them. We think it is now up to you to put that capital back in the form of forest-capital. You are in fact accepting this principle to-day because you pay to afforesters grants of public money to enable them to afforest and to tend their new woodlands. It is true that you do so on an unsatisfactory basis, but you do it nevertheless." My own view is that the State could reasonably be expected to contribute the whole cost of the task of re-creation of our forests, not merely as producers of timber, but when they fulfil protective and other functions. Hence I am led to the conclusion that in considering the possible limits to afforestation in Scotland, economics or rather finance does not come into the question. We transfer capital to repair other national disasters without expecting interest thereon. Why not also repair the national disaster of our devastated forests?

I propose, therefore, to narrow down the issue and to assume that what is meant by limits in our terms of reference are *physical* limits to the satisfactory *growth* of forests, not merely, however, for *producing* timber but also for other purposes. Even so, there still remains room for a difference of opinion about what a forest is. Some would probably insist that the re-created forest should be able to reproduce itself by natural processes. I am not prepared to go that far, however, for even

in nature we know that beyond the limits within which the forest at the timber-line regenerates itself successfully, there are usually dispersed belts of trees, or isolated trees, arising from a scatter of seed, which can nevertheless be of value, from the protective, aesthetic and other aspects. We can thus, in some circumstances, build up similar belts artificially with no hope of their regenerating, so that, in effect, the physical limit for afforestation is not necessarily a line beyond which natural regeneration becomes impossible.

Now, having narrowed down the issue thus far, we may ask what are the physical obstacles to afforestation in Scotland, meaning by afforestation the creation of any form of forest-cover fulfilling a useful function?

There are a number of obstacles to tree-growth, which may be divided broadly into two main classes, namely, animate and inanimate. With regard to the former, there will be those, perhaps, who tell us how the existence of certain organisms lethal to trees sets a limit to afforestation—such things as deer, rabbits, hares, voles, etc. If, however, we are not going to consider the *cost* of dealing with these pests, their existence will not, as a rule, set any limit to afforestation. It certainly makes it much more costly, but they can be controlled. Another possible limit to afforestation is the great difficulty of obtaining the necessary planting-material or seeds of the species, or strains of trees, which *alone* can grow under physical limitations. However, if they exist, it should be possible to produce trees—again, at a cost.

Finally, I come to the climax of my argument—that the real limits to afforestation are set by the inanimate physical factors; these can be divided into factors of climate and factors of site or soil. With regard to the latter, it is relatively easy to discover those site conditions which make tree-growth impossible. For example, a sheet of solid rock or a salt marsh or a bare shingle bed on the sea-coast will not grow trees. Certain types of peat will not do so either. Such areas are relatively infrequent over most of Scotland, except possibly rock, and unaffordable peat in certain parts in the west and north of the country. With regard to the climatic factors which set a limit to afforestation, it is much less easy to recognise the location of the limits which they set. It is, indeed, one of the most difficult tasks in afforestation to determine these limits when the soil conditions are favourable to tree-growth, and the temptation is often strong to plant trees beyond them merely because of the satisfactory nature of the soil.

With regard to the climatic factors which, when unsatisfactory, set a limit to afforestation in Scotland, the most important are temperature, precipitation, air-humidity, wind-pressure and salt-spray, evaporation and sunlight. Only three of these by themselves, however, can, I believe, check tree-growth completely, namely, insufficient heat, insufficient moisture and excess of wind-pressure. Combinations of these three, or any two of them, would be even more prohibitive. There are few places—I should think none—in Scotland where precipitation is insufficient for some form of forest-growth. There are considerable areas, especially in coastal regions fully exposed to the prevailing westerly winds, and in our mountain regions above certain altitudinal

limits, where wind-pressure absolutely precludes afforestation, by making any tree-growth impossible.

It is less easy to be so explicit about temperature, a factor which can be measured in various ways. One way is to compute the length of the growing-season on some suitable basis. This is work in which Dr Fairbairn has been engaged in the Forestry Department at Edinburgh University and I do not wish to anticipate these findings. It does seem, however, that in Scotland the length of the growing-season falls with altitude to some 112 days at 2,250 feet and to about 100 days at 2,450 feet. In Bavaria, however, tree-growth occurs at altitudes where the growing-season lasts only 60 days. Such a length would correspond to about 3,500 feet of altitude in Scotland. Here, however, it is certain that the factor of wind-pressure is much more destructive than in Bavaria and is bound to have a lengthening effect upon the period required for satisfactory tree-growth.

Apart from these theoretical considerations, evidence of actual tree-growth is available to show that, at least in the eastern half of the country, the limit of afforestation lies somewhere around an altitude of 2,250 feet. Plantations have lived satisfactorily—under good soil conditions, of course—at these elevations in Upper Deeside, in Glenisla and on the slopes above Loch Ericht, proving that it is not the lack of temperature that prevents tree-growth at or beyond these altitudes. All the evidence goes to show that the nearer the western sea-board, the lower lies the limit of tree-growth, especially on aspects facing the sea. We can assume that wind-pressure is, in these cases, the main limiting factor, possibly in combination with other climatic, and often with soil, factors.

In this connection, I would like to suggest that at the present time enough afforestation is not being done in the high-lying land in the eastern and central Highlands of Scotland. The evidence exists that forest can be re-created there over wide areas up to 2,000 feet, especially on the more fertile slopes, and that quite productive stands can be grown up to at least 1,750 feet in all but very exposed areas where the soil may be too shallow. I am not sure that the use of birch and other leaf-tree species, especially races of the common species from special localities, could not be grown for another 250 feet higher—if not for productive, at least for protective purposes. It certainly needs to be investigated. Present-day afforesters are far too timid. The limits they have set to possible afforestation in Scotland are much too low—particularly in the eastern and central areas away from the impact of the prevailing westerly winds.

It is in these areas that sheep farming is often replaced by deer-forest and grouse-moor, and while it is natural that serious objections should be raised by sheep farmers to the loss of land for forestry, the same is less applicable to deer-forests, although it is surprising how vocal their protagonists can be. What prevents the authorities from making inroads in these areas is, I think, an entirely wrong attitude to the rate of timber production to be expected. We hear far too much about the high annual production per acre in a few quite exceptional sample areas—up to 300 cubic feet and more. Nothing like that will be

obtained in the high areas to which I have referred. There the production may be as low as 30 or even 20 cubic feet per acre per annum, quite 'uneconomic' of course, but where land suited for timber-growing but *not* for other important land-uses is available. The forests created there will be rather open and interrupted, but there is also the possibility that they will be of great value both to the sheep farmer and to the owner of deer-forest. Actual evidence for this is not lacking, as anyone who has seen the celebrated Corrour plantations carried on by Sir John Stirling-Maxwell will know. What is needed is less orthodox economics, more imagination and much more enterprise. Whenever we pay more attention to the protective and other functions and less to the productive functions, we should be encouraged to afforest considerably higher up in the hills wherever trees will grow.

MR M. V. EDWARDS (*Silviculturist (North), Forestry Commission*):

I would like, first, to consider this country in relation to its geographical position. We live in the cooler part of the north temperate zone, which, in general, is typified by the northern coniferous forest. In spite of this we have only one native timber-producing conifer. In contrast the seaboard of the western coast of North America has very many coniferous species. Our poverty is due to the chances of re-invasion of vegetation in post-glacial times, but it puts us in rather a special position in that a host of exotic species thrive in our climate and, in fact, grow very much larger, faster, and sometimes more hardily, than our native trees.

We also have the disadvantage that the natural forests which this island once possessed have suffered exceptionally severely by the hand of man—firstly, despoiled by invaders from Scandinavia and Central Europe, then cut and burned to facilitate the eradication of wild animals and warlike men, and then further devastated to provide timber and fuel at the beginning of the industrial age. Even the less accessible and less luxuriant forest at higher elevations suffered severely. We have, therefore, little evidence of the extent of the natural climax forest; no forest, properly speaking, is left, and the remnants are rarely even worthy of the name of woods. Even the surviving trees are the remnants of woods from which, probably, the best individuals have been taken; they are the final stage of a period of negative selection.

There are, of course, remnants of the trunks and roots of trees buried in high-level peat and in the far north, but their age is uncertain and may date back to Atlantic or sub-Boreal times when the climate was more favourable to tree-growth than it is to-day. They cannot, therefore, provide evidence as to the extent of climax forest under existing climatic conditions. Indeed we have all too little data as to what might be, or might have been, the limit of forest in this country, or upon which to base comparisons with other countries better off than we are. And since it is not easy to make deductions from existing woodlands, we must inevitably theorise to a considerable extent.

While excessive wind-pressure is certainly *one* of the most important

factors limiting tree-growth in this country, I wish to stress the importance of temperature. This factor can be assessed in several ways, firstly, as the number of days in the year on which the mean temperature exceeds 42°F . (a useful approximation of the length of the growing-season in any one region), and secondly, as the mean temperature of the warmest months of the year. However, with a reasonably long growing-season, we have, at the same time, a surprisingly cool climate. If the temperature data for Fort William be compared with that from the station which was maintained for some years at the top of Ben Nevis, a curve for the 2,000 ft. contour line can be drawn which indicates a growing-season of approximately 150 days at this altitude, but the mean temperature for the warmest month of the year is only a very little over 50°F .; the annual temperature curve is a very 'flat' one. Annual temperature curves for the eastern seaboard of the United States or for places in Continental Europe in comparable latitudes to this country tend to be 'steeper'. It is, therefore, evident that when the mean annual temperature curve is 'flat', i.e. the annual range is small, and there is no compensatory warm period at mid-summer, an increase in altitude will cause a proportionately greater reduction in the growing-season than in regions where the curve is 'steep', i.e. the annual range is large. Reduction in the length of the growing-season can also be produced by excessive cloudiness, as is common in the west of Scotland, or high humidity, both of which effects on temperature are greater when annual ranges are small.

Moreover, temperatures are not easily modified. In comparison, it is easier to deal with wind since a forest can, to some extent, build up its own shelter. This is admirably illustrated by the famous 'pentroof' effect on the edge of the woods at Gosford House on the coast road to Aberlady, where a wall has enabled the trees to grow up in its shelter and then, as they have become exposed, the canopy of the crop has been planed off on an extremely regular slope like the roof of a house. But this slope rises rapidly, indicating that if the trees can be established the effect of exposure is very much less inside their boundary. That a forest is a viable organisation and not simply a collection of individuals is especially noticeable in its response to the effects of wind.

A further most important effect of temperature is, of course, that on the soil, and soils at high elevations differ from those lower down just as much as upland forests differ from those in the valleys. Thus, the recently published Soil Survey in Banffshire notes that there are no brown forest soils over 1,000 feet, above which soils become less and less well developed till they are skeletal or simply rock. But soils can be modified more than might be expected, and I would like to recall the early history of some experiments in afforestation in Invernessshire. One of the earlier experiments at Inchnacardoch Forest, near Fort Augustus, was to provide shelter by placing small wooden boxes round the plants. The relics of these trees can still be seen, most of which are dead, and none grew well. It was soon found, however, that the limiting factor, in this case, was not the climate but was the suffocation of the roots by lack of drainage, and also the lack of phosphate. Developments from this experiment have led us to the modern

technique of ploughing and manuring which has made the recent extensions in afforestation possible. Again, at a later stage in the same experimental area, two plots of Japanese larch some 20 years old can be seen side by side, one 15-20 feet high and looking quite healthy, and the other bent, with all the side branches leaning away from the wind—in fact, suffering severely from what one would call ‘exposure’. But the only difference between the two plots is the presence of phosphate on the first one.

Another attempt to mitigate the severe climatic conditions was the introduction and sowing of larch and spruce seed from high altitudes in Switzerland at a high elevation in this country to ensure that the plants became conditioned to their hard environment. But, unless one is a follower of Lysenko, it is found that such resistance is inherited and not acquired and that the genetical constitution of plants from the Alps leads them to flush in the spring when the hard cold of winter has gone. That may often be in February in this country, even at high elevations, but later in the season such plants suffer severely from the spring frosts which are a feature of our climate and they prove quite unsuitable. Winter cold is rarely a difficulty for plants in the resting season, but low temperatures after the resting period is over can prove mortal.

I suggest, therefore, that though we have not much evidence yet from which to make deductions, the *climatic* limits for afforestation are probably quite a long way from being reached as yet. Similarly, provided there is a soil, and not simply a rock, much can be done to improve it. Soil improvement is partly a matter of expense, and within economic limits cultivation and manuring in its various forms have enormous possibilities.

However, most of what I have outlined concerns the factors limiting the growth of trees, and of forests, which, as I have intimated, may be less rigorous than for the individual tree. But the limits to afforestation are different. While we are trying to put back our lost forests again, we only want to do so when and where we have sound reasons for needing a forest. This may, for example, be for protective purposes. In this country there is not the same necessity for forests to control torrents and avalanches as exists in more mountainous regions and we are fortunate in only having these problems on a small scale. Though planting for this purpose is desirable in some places it is not an important reason for widespread afforestation. Nor is afforestation of the gathering grounds of water catchment area essential in this country and climate. The existing vegetation, both live and dead, as peat, is retentive of moisture and usually proof against erosion. In fact, there is a sharp difference of opinion amongst water engineers as to the desirability of the afforestation of water catchments.

Then there is the case of the protection of agricultural crops or stock. More interest is again being taken in the shelter-belts which have played such an important part in the layout of many Scottish farming areas. However, to be worth their cost, such belts must be sited where there is scope for them to exercise useful improvement and this is unlikely to be on land which is so poor or exposed as to be near

the climatic limits for afforestation, because then it will also be poor agriculturally. In such a case I do not see the climatic limits of forests being the limiting factors; as an example I would cite the case of Orkney, where, when the Danish-Orkadian conference was held two years ago, expert opinion from Denmark thought that the climate was not such as to make a proper layout of shelter-belts of trees impossible. The belts would have to be multiplied to reinforce their protective effect, but this would be worth while where the land was of sufficient value agriculturally. I do not suggest that shelter-belts can be grown everywhere in Orkney, but that they would be possible where valuable from the agricultural point of view.

Much afforestation, State and private, is being undertaken with the production of timber in view. It will be a long time before all the land which should be devoted to producing good timber will be afforested, even at the present rapid rate of progress, but no doubt the time will come when climatic limits to timber production will have to be taken into consideration more frequently than at present. Partly they will tend to operate in the limits they impose, by limiting the choice of species. Experimental planting is now being carried out with the aid of one of the newest exotics, the lodgepole pine. At present, the idea is to use this species as a pioneer to establish a forest-cover within which it may be possible to raise other species of more value. Its value as timber is as yet unproven and, in any case, no pine is likely to have the merits of very high volume production. There may be a limit somewhere beyond which only lodgepole pine can be grown, but if so, then the real limit to afforestation is not the climatic one, but the economic one of the value of the species.

More important is the limit at which the climatic or soil factors reduce the timber increment below the economic minimum. That is very difficult to estimate, because any such determination must be based on the productivity of well-managed existing woods, and these are rarely found widely distributed and in sufficient quantity over the limiting range of conditions. However, in Deeside something of this sort has been found possible, and there a war-time survey showed that Quality Class V woods ranged from 1,100 to 1,800 feet. That might well be improved on, both by soil treatment and by using exotic species, as has been done in recent years. But forestry is a long-term business and the answer to these problems cannot be obtained until the trees are reasonably mature. It does not follow that trees which start their growth satisfactorily will continue to grow well, and progress at the marginal areas of afforestation must necessarily be gradual.

DISCUSSION

MR A. PATON (*Technical Development Officer, Department of Agriculture for Scotland*): As an agriculturalist disclaiming any deep knowledge of forestry, I would like to raise the question of the establishment of shelter-belts or plantations in those situations where the present limiting factors to the extension of forestry are exposure and excessive wind-velocity. I wonder if the solution to the problem might not be found in the establishment of screens of quick-growing species which could be readily raised from cuttings, such as willows or poplars, even though these might, when grown in such situations, have no economic or commercial value in themselves.

They might, however, provide a wind-break sufficient to permit of more desirable or more valuable species being progressively planted and successfully grown on their leeward side.

MR M. A. M. DICKIE (*Chief Lands Officer, Department of Agriculture for Scotland*): While a certain amount of useful information is available on the benefits of shelter to crops and temporary grass, it would be most helpful, in planning the integration of forestry with agriculture, to have more definite information on the value of shelter to stock on rough grazings. Between Edinburgh and the Borders there are many hill shelter-belts and plantations of varying shapes and sizes, all evidently deliberately planned by proprietors in the past; might not some useful data be procured fairly quickly from a joint survey of a selected area by the Forestry and Agriculture Departments of the University? Proprietors, tenants and shepherds must have views on how useful these plantations have proved, by provision of shelter for stock, improvement of grazings and supply of timber for use on the farm.

MR A. H. H. ROSS (*Director of Forestry for Scotland*): I am encouraged by what Professor Anderson has said about the silvicultural possibility of extending plantations to higher elevations than have been generally accepted as safe limits in the past. The Forestry Commission are in fact already doing this in so far as it can be justified by continually improving techniques. I am unable, however, to agree that either the Commission or the private landowner can afford to ignore the financial aspect. It can well be argued that increment rates per acre per annum considerably lower than the very high figures for some exotic conifers in the fast-growing areas should be accepted. There is a limit, however, below which a crop cannot pay financially, and even where planting is done for shelter or protection the rate of growth has to be sufficient to provide an adequate result in a reasonable time. The post-War II programme of 5 million acres of productive woodland in Britain within 50 years will not fulfil its purpose if much of the bare-land part of that programme is sited on land too high and too poor to grow commercial tree crops. Surely the better alternative is to afforest potentially productive land which at present is only partially utilised or not utilised at all, for example, the half-million acres or so of heavily bracken-infested land which exists in Scotland to-day and which is a growing menace to hill-sheep farming.

MR J. CUNNINGHAM (*Department of Agriculture, Edinburgh University*): Professor Anderson's suggestion to plant higher must be welcomed as it could help to reduce the strain of the demand for good hill grazings. Hill land is too often valued purely in terms of meat, but this should not be so, since the sheep industry is organised in Scotland whereby the hill ewes are the foundation of nearly all the breeding ewes carried on low-ground farms—a contribution which is of major importance. It should also be remembered that land growing bracken is fairly good and that the answer to the bracken problem is not to plant trees as suggested by the former speaker but to find how to eradicate the pest. Perhaps our speakers would comment on the problem of the assessment of hill lands in respect to their contribution to the economy of the nation both from trees and from agriculture.

LORD GIBSON (*Scottish Land Court*): I would like to thank the speakers for their thought-provoking addresses. When the whole of the in-bye land of a Highland glen is afforested the agricultural balance between in-bye and out-bye is entirely upset, since the in-bye is no longer available for the production of winter fodder for stock normally summered on the hill. A conflict of interest thus arises between afforestation and agriculture, but one which need not become acute by unnecessary encroachment on the in-bye land for afforestation. Professor Anderson in the course of his address mentioned the effects of wind-pressure on the growth of trees. This pressure on any of the Hebridean islands is very high indeed. Yet the Isle of Eigg has a flourishing orchard in addition to successful glass-house and market garden crops. The orchard is fenced by concentric rings of trees which provide abundant shelter for the fruit trees they surround—as far as I can remember, the outermost ring of sheltering trees being hawthorn or some other genus of the 'thorn' family, followed by a circle of birch, a circle of strongly grown pine, within which is the well-sheltered and flourishing orchard and market garden. This would seem to support the suggestion that the growth of fir trees in Orkney might be stimulated by growing a protective bank of willow.

MR J. R. THOM (*Conservator, Forestry Commission Directorate, Scotland*): If Pro-

fessor Anderson's strictures regarding the timidity of the Forestry Commission relate to the inter-war period (1920-39), then I disagree with him. During this period the Commission suffered several financial crises; lack of money as well as of trained personnel were very real limiting factors to progressive forestry. Accordingly, I consider that the Commission was wise to concentrate its afforestation programme on areas where it was reasonably sure that trees would grow and give respectable volume figures in the not too distant future. Land was more plentiful then and I feel that the Commission was correct in spending its meagre annual budget on acquiring as good quality land as it could get rather than poorer land and perhaps laying down plantations, the future of which was in doubt. Looking back over this period I feel that the Commission can view its energies with a certain amount of satisfaction in the large area of plantations now successfully established. On the other hand, if Professor Anderson is referring to post-war planting, I am in a certain measure of agreement with him. We have approached a period of 'land-hunger' as far as forestry is concerned. It may well be that a bolder approach to higher planting will increase the amount of land which could now be successfully planted. Indeed, the Commission is now doing this on a limited scale and circumstances may make it necessary to extend planting on these high-elevation areas. I would like to stress, however, that in my opinion the extension of planting to such areas will not offset the better growth to be expected from lower altitudes.

DR R. MACLAGAN GORRIE: I would like to thank the Society for this second opportunity to discuss a vital subject, the first being in April 1947. I criticised the Forestry Commission then for restricting their planting to sites which were capable of producing an assured economic return under trees. Since then, however, the Commission has progressed in the choice of species for high-level planting: in 1947 the only evidence available was from a few private plantings carried up to around 2,000 feet, but the Commission's recently established plots of mountain conifers, such as Cembra pine, and various spruces, in Lael Forest are a step in the right direction. French experience in the mountain communes of the Auvergnés shows that on ground quite as poor and windswept as many Scots sites afforestation of private and communally held land can be secured by offering easy terms; the French government pays 70 per cent., the department 27 per cent. and the commune or private owner only 3 per cent. of the bill. The Forestry Commission's dedication terms do not adequately meet the problem of the smallest plots and the poorest land.

MR BRUCE URQUHART (*Chief Technical Officer, Co-operative Forestry Society (Scot.) (Ltd)*): As an officer of the Co-operative Forestry Society, and also as an owner of both agricultural and forest land in the north of Scotland, I must disagree with Professor Anderson on the importance of economics. Forestry could and should be made to pay, and to keep forestry profitable is about the only way to ensure full use of forest land. There is a tendency for estates to be split into smaller and smaller units as hit by death-duties and high taxation, and the nation will lose the use of these smaller woodlands, invariably on good land, unless their use for timber production and shelter is made financially attractive. Better grants for the more expensive, small woodlands are needed and the home-grown industry should have a guaranteed price-structure similar to agriculture.

DR J. TIVY (*Geography Department, Edinburgh University*): Although the problem of destructive soil erosion has not attained the same proportions in Scotland as in the more arid regions of the world, it occasionally has disastrous consequences particularly on high and steep ground, and flooding, often widespread, is practically an annual event in many upland valleys in the north and south of Scotland. In both instances, it is usually the in-bye land on the haugh lands of the valley floors that suffers. Both erosion and flooding, although essentially natural phenomena, have probably been aggravated by the destruction of natural forest and the degeneration of upland vegetation consequent upon continuous sheep grazing. Might not judicious afforestation of selected areas, on soils and at altitudes which would not produce good-quality commercial timber, pay less tangible dividends, not only in the provision of shelter and beauty, but in the amelioration of surface run-off and of the often severe slope erosion which is to-day destroying considerable areas of the steeper hill grazings, particularly in the Southern Uplands—and, in doing so, assist rather than obstruct the hill and marginal farmer?

THE MOUTH OF THE SPEY

A. T. GROVE

THE mouth of the Spey alters more rapidly from year to year than almost any other section of the coastline of Britain. The steep lower course of the river, below Fochabers, runs over a gravel fan which is bounded on either side by the remains of raised beaches and deltas, and on the seaward side by a number of shingle ridges extending west from Portgordon (Fig. 1—A). The older ridges were probably formed when the sea stood higher than now; the latest ones nearer the sea are lower, and the most recent extends from Tugnet across the mouth of the river and deflects its flow towards Kingston. Similar multiple systems of ridges stretch along the coast at the foot of Binn Hill and form what Ogilvie aptly called a transport causeway.¹ Except for the growth of sand-dunes opposite Lossiemouth this western end of Spey Bay has altered little in living memory, but the position of the mouth of the Spey has fluctuated violently throughout the last two centuries.

So far, no good evidence has been found to support the old tradition that the Spey "once ran westward in a narrow cut of hollow ground parallel to the shore . . . and entered the sea almost 3 miles west of its present mouth, opposite to a hill yet called Spey's Law".² Several centuries ago it may have emptied about a mile west of Kingston where air photographs show that the shingle forms a number of hooks curving into a strip of low-lying ground, marked as a morass on McGill's map of 1726 (Fig. 1—B). For long it has found its way out to sea further east.

Vessels of 350 tons burden were able to enter the Spey at the end of the eighteenth century, and ships were built at Garmouth and Kingston until about 1875.³ But the shifting waterway was a constant source of trouble and expense. Much money was spent in stopping up a mouth which threatened to carry off the houses at Tugnet, and a few years later, in 1815, attempts to protect the bank at Kingston cost about £300.⁴ At this time the mouth of the river was little more than 20 yards wide. Then, in August 1829, the river came down in spate; the water rose 13 feet 9 inches above the ordinary level at Kingston and a breach, 400 yards wide, was made in the shingle at the mouth of the river.⁵ Six years later an Admiralty Survey was made which shows the river channel in more or less its present position (Fig. 1—C). In the interval, the shingle spit at the mouth has run through three cycles of evolution.

The village of Kingston, 120 years ago, extended further north-west than it does to-day. However, in 1844 the river was deflected towards the village by the growing shingle spit and several houses were carried away. Plans were made to cut through the shingle and to prevent the river taking its old course by driving in piles and hanging the heads of fir trees from chains suspended across the river. The cut originally made was too shallow, and gravel filled it again before the other works had been completed. More property was destroyed, and after another unsuccessful venture in 1857 (Fig. 1—D) a new outlet was

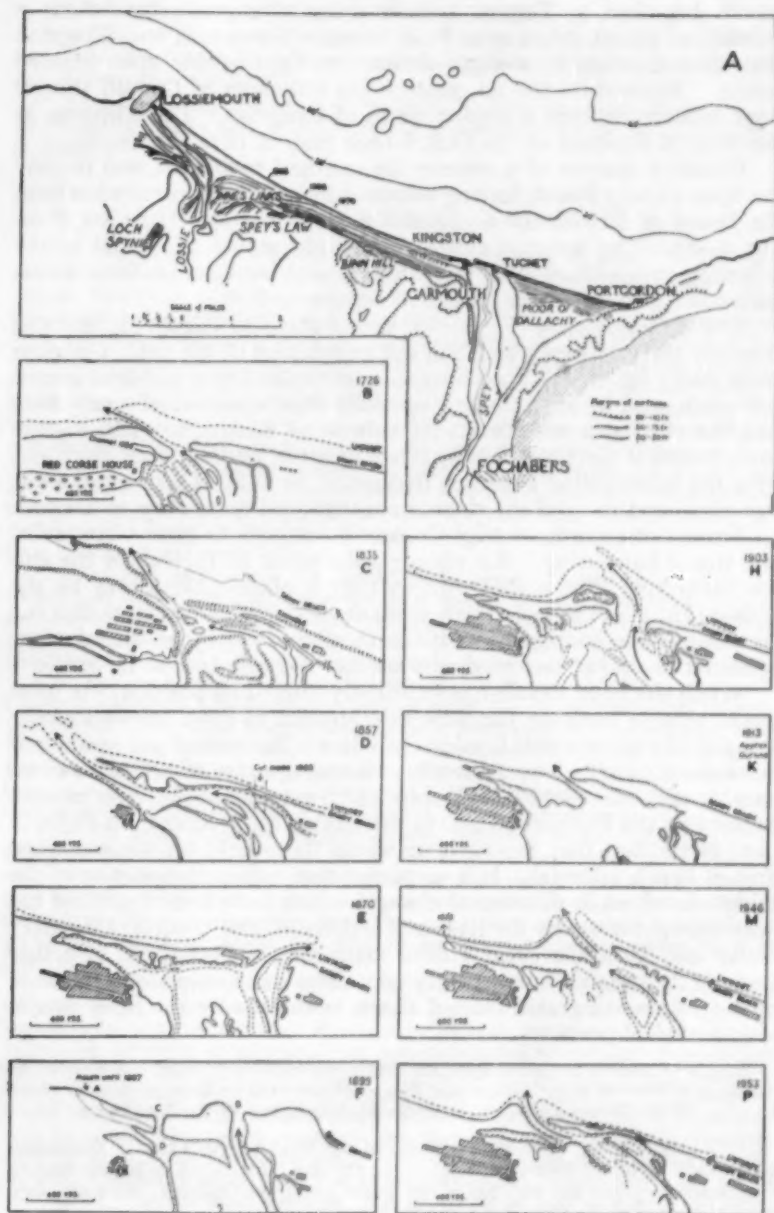


Fig. 1.—A. Spey Bay and the mouth of the River Spey; insets B to P indicate positions of the River outlet from 1726 to 1953.

successfully completed in the spring of 1860.⁶ For several years the mouth lay close to Tugnet, and in order to improve the fishing a number of gravel dykes were built between Garmouth and Kingston to confine the river to a single channel on the east side of its braided course. Meanwhile the sea pushed the remnants of the old shingle ridge inshore to form a lagoon north of Kingston. The situation at this stage is depicted on the O.S. 6-Inch map of 1870 (Fig. 1—E).

Within a quarter of a century the spit had re-formed, and in 1897 the Spey Fishery Board, having obtained the necessary permission from the Board of Trade, cut a channel through the spit (Position *B* on Fig. 1—F). The sea soon closed up the old mouth at *A*, and in the following year washed away part of the gravel bank at *C* to form a new outlet and also raised up a bank of shingle at *D*.

The survey of 1903 (Fig. 1—H) shows that the Tugnet shingle spit was only 180 yards long and had not grown west of the cut. Only ten years later (Fig. 1—K), according to a survey by Ogilvie, it had grown 500 yards, and by 1933 the spit was fully three-quarters of a mile long and the river entered the sea north-west of Kingston. The shingle bank impeded the river coming down in spate, and between 1927 and 1933 the surrounding land was frequently flooded. Once more a cut was made and in 1938 the river again went out quite close to Tugnet.

From past records we might expect the shingle to grow west again, and this is happening. Air photographs taken in 1946 show the spit 200 yards long (Fig. 1—M), and in 1953 a plane-table survey by the author (Fig. 1—P) shows a further prolongation of 300 yards, so that the present position corresponds with those of about 1915, 1885 and 1835. Within a decade or two no doubt another cut will have to be made.

While the river mouth has repeatedly altered its position, the most recent shingle bank on the west side appears to have grown steadily along the beach towards Lossiemouth over a distance of one and a half miles since 1870.⁷ This represents an average rate of extension comparable with that of the shingle spits which grow across the river mouth. Erosion on the Portgordon side of the Bay seems to have been slight in spite of the fact that the harbour works there hold up the westward drift of beach material. It is suspected that a large proportion of the shingle involved in the coastal changes which have been described has been brought down by the river and is derived from erosion of the river banks and from the great gullies south-east of Fochabers. Further study of the coastal shingle ridges may allow some estimate to be made of the volume of gravel carried down to the sea by the Spey over a long period of years.

Figs. 1—E and H are taken from Ordnance Survey 6-Inch maps and C from an Admiralty Chart of 1835. These and Fig. 1—A are used by kind permission of the Director of the Ordnance Survey and the Hydrographer to the Admiralty.

¹ OGILVIE, A. G. *The Physiography of the Moray Firth Coast. Transactions of the Royal Society of Edinburgh*, 1923. 53: 377-404. Fig. 1—A is largely derived from maps on pages 397 and 399 of this paper, and from Ogilvie's 'Six-inch' field maps deposited at the School of Geography at Oxford.

² *New Statistical Account*, 1845. Vol. XIV, p. 390.

³ High spring tides affect the river for about 1000 yards upstream.

⁴ *Gordon Papers*. These are housed at the Scottish Record Office in Edinburgh and include the map from which Fig. 1—B is taken.

⁵ LAUDER, SIR T. D. *The Moray Floods*. 3rd Edition, 1875, pp. 248-9.

⁶ *A Memorial for Opinion of Council, 1899*. This manuscript, together with maps on which Figs. D and E are based, were kindly shown to me by James Hardie, Esq., Crown Factor at Fochabers.

⁷ I have to thank Captain J. E. Young of Aberlour for pointing out to me the growth of the shingle near Boar's (or Bear's) Head Rock and for other information included here.

THE GOVAN SOCIAL SURVEY

The Department of Social and Economic Research of Glasgow University has recently instituted a Social Survey of the Govan district of Glasgow, which is to occupy three years. This enquiry, which is being carried on in co-operation with the Departments of Social Medicine and Psychological Medicine, is not intended to be final, nor to be an investigation of any particular problem. The idea is, rather, that the Govan area should be examined more or less continuously over a number of years, to provide material on a variety of subjects of general interest. Substantial economy of effort can obviously be effected by using the same area for several studies. For example, the sort of information which will be required for a study of mobility of population will be immediately useful to any study of housing conditions, or to an examination of ownership of property, or even to a study of the living conditions of old people. Where accurate measurement rather than qualitative description of particular phenomena is required, the practical difficulties associated with the definition of a useful geographical area and the analysis of its population structure have only to be met once.

The subjects with which the enquiry is at present concerned include: the mobility of labour and population, the incidence of illness in the family, and an examination of what might be called 'earning and spending at the margin'. This latter study is intended to cover spending on recreation and non-necessities on the one hand, and income from overtime working and part-time and odd jobs on the other.

One striking feature of the area which has already emerged is the very great variety of household arrangements in an area which though predominantly manual-working class, is far from being homogeneous in other respects. For example, most of the houses are small, of one, two or three rooms, but out of 9,500 households in the Govan ward there are 1,000 households of only one person each, and nearly the same number of seven or more. More than half the households have two or more wage-earners, 21% have three or more, and in 20% everybody is working.

From the point of view of the wage-earner, individual responsibility also varies considerably. Only one wage-earner in five is in the position of being the sole earner in a household with dependents, and in more than a third of these there is only one dependent each. Three wage-earners out of five have no immediate dependents, either because they live alone or in households where everybody is working, or, alternatively, because they are lodgers or unmarried adults living at home in the status of lodgers.

Not all wage-earners receive the same income, of course, and progressive income-tax reduces the apparent advantage enjoyed by the single man earning £10 per week over his workmate who has to keep a family of six on the same wage. Nevertheless, the difference in potential living standards is real enough and although this kind of contrast might be found anywhere, what makes Govan interesting is that there are such large numbers at each point on a very wide scale. The range in money income per head, as distinct from individual earnings, is probably as wide as in any community in the country. The range in welfare, at least in generally accepted terms, is nothing like so great. The social structure of households and the patterns of spending which make this so are among the subjects which are to be investigated. As the work develops, it is hoped to include studies of religious, political, and other associations, and of the working of the welfare services, but provision will also be made to carry out snap enquiries on any subject of particular interest.

T. BRENNAN.

DR JOHN H. KENNETH

THE occasion of the resignation of Dr John H. Kenneth from the Editorship of *The Scottish Geographical Magazine* in order to retire to the Clyde estuary, on which he enjoyed so happy a youth, provides the opportunity and the excuse for a note by a fellow student, a shipmate in the Arctic, and his President in the Society he has served so well.

Kenneth was born in Glasgow in 1886 and went to the famous Academy of the 'Second City' for part of his early education, and for the rest to Germany. The less formal educative influences which left a deep impression and helped notably in shaping his career he found on holiday in the Firth of Clyde area, in Belgium, in Switzerland and the Tyrol. Between 1905 and 1908 he studied a wide range of science subjects at the University of Freiburg and acquired a taste for skiing in the Black Forest and the Swiss Jura, learning some of the skills he was later to employ at lower levels but higher latitudes in the Arctic. His active interest in marine zoology dated from a short session at the Russian Marine Laboratory at Villefranche-sur-Mer in 1908, just prior to his return to Glasgow, where he embarked upon some zoological research, under Professor J. Graham Kerr, which occupied him until his appointment as Demonstrator in Zoology in the University of Manchester. The First World War, during which he served with the R.A.M.C., interrupted his studies, which he resumed in 1919 in the University of Edinburgh, returning to his natural history subjects and working under J. Cossar Ewart and J. H. Ashworth, and adding Geography, Psychology, Political Economy and Russian. He took his M.A. in 1922 and then, with that catholicity of interests more characteristic of Renaissance savants, he took up Experimental Psychology and gained his Ph.D. for work in that field in 1924. There were, however, two ruling passions in his life—a vivid interest in the world, traceable back to the fascination an atlas had for him at the age of seven, encouraged by the travels that marked his youth, and fired by the enthusiasm of Dr W. S. Bruce of the *Scotia* and Professors Chisholm and Grant Ogilvie in his alma mater; and a distinct bent for zoology early stimulated by the works of J. Arthur Thomson of Aberdeen, and encouraged later by his studies under A. Weissmann at Freiburg, J. Graham Kerr at Glasgow, and J. Cossar Ewart and J. H. Ashworth in Edinburgh. He was thus fortunate in belonging to a period of giants and personalities, who shaped his career, and encouraged a love of original research and a joy in exposition.

Kenneth first met Bruce at a meeting of the Royal Physical Society of Edinburgh, and followed that with a period at the Scottish Oceanographical Laboratory, presided over by those ardent brothers in Polar research, Bruce and Mossman. This led to his joining the expedition on the Norwegian sloop *Pelicans* to Spitsbergen in the summer of 1914, directed by Bruce to pursue hydrographical investigations in the Stor Fjord. This plan was defeated by the extraordinarily heavy ice conditions to the east of Spitsbergen, and the party made for the west coast where, at Green Harbour, they first heard of the outbreak of war.

Kenneth and R. M. Craig—then of St Andrews University but later on the staff of Edinburgh University—were set ashore on Prince Charles Foreland to conduct a geological reconnaissance from the east coast to the west, closing the Scottish contribution to Arctic research till 1918. In 1919, Bruce organised the most impressive attack on the cartographical and geological problems of Spitsbergen, and enlisted the help of Kenneth at the early stages both in Oslo and Tromsø, where he served as agent for the expedition, for which his previous training and experience fitted him admirably. At Tromsø he joined the expedition and rendered invaluable service, thanks to his contacts with Norwegian officials, ice pilots and the staff of the Store Norske Spitsbergen Kulkompani at Advent Bay.

The years between the World Wars were devoted to scientific activities in a variety of zoological fields, work for the Imperial (now Commonwealth) Bureau of Animal Breeding and Genetics, and editing the 3rd, 4th and 5th editions of Henderson's *Dictionary of Scientific Terms*. Geography, likewise, attracted part of Kenneth's energies, and on the invitation of Professor A. Grant Ogilvie he joined his staff as Assistant. He had become a member of the Royal Scottish Geographical Society in 1919 and was elected a Fellow in the session 1921-1922. He was greatly impressed by Dr. M. I. Newbigin and was very glad when in 1945 he took over the Editorship of *The Scottish Geographical Magazine*, the course of which he has shaped with skill and success for the last ten years. The scope of the magazine has changed since his Spitsbergen days, for then it was one of the few scientific geographical periodicals and had to deal with material from all over the globe; now so many countries have their own geographical journals *The Scottish Geographical Magazine* has become more and more the organ employed by researchers in Scotland, although not necessarily restricted to research on Scotland, for over the years it can be shown that roughly half of the original articles deal with subjects beyond these borders. The standard of the contributions has been zealously maintained by the Editor, and the magazine enjoys the highest repute the world over.

The Royal Scottish Geographical Society enjoys a large and appreciative membership. Its lectures reach and appeal to its immediate circle, but fade from the memory session by session. Its library and its map collections are sources of valued aid to a limited number as circumstances demand. *The Scottish Geographical Magazine* reaches out to universities, institutes, colleges and societies across the world and remains on library shelves for consultation as years roll on. For the place of our Society in time and space, therefore, a great deal of the credit is due to the officer who works quietly behind the scenes and is known to but few of our members—the Editor. The Society has been more than fortunate in the line of distinguished and yet self-sacrificing individuals who have filled that office, and our sincere appreciation goes to Dr John H. Kenneth for the manner in which he has so admirably employed his career and his capabilities in worthily maintaining the tradition already established and in setting the highest possible standards for those who follow after.

DOUGLAS A. ALLAN, C.B.E. (President).

THE STATE OF FOOD AND AGRICULTURE : A REVIEW

C. J. ROBERTSON

STUDENTS of world food supplies have during the last year benefited by the publication of an unusually rich documentation of authoritative fact and commentary. The Food and Agriculture Organization of the United Nations has published three regional surveys of agricultural development and outlook in addition to its annual summary of *The State of Food and Agriculture*.¹ Sir John Russell, in his compendious volume on *World Population and World Food Supplies*,² has brought together much material otherwise only to be found in widely scattered agricultural publications, in addition to comments based on his own long and unusually rich contacts with agricultural research. We could wish indeed that he had drawn still more on his wide opportunities of agricultural observation in many parts of the world, in place of some of the pages of statistical data readily available in official international publications. The pages in which he gives us more general interpretations of the present stage and possibilities of agricultural development are all too brief. These publications, official and non-official, provide the geographer with much material for further digestion and systematisation if he is to build it into a world picture of agricultural development.

The 1954 report of the Food and Agriculture Organization shows a very considerable change of emphasis from those of previous years. The average annual increase in agricultural production in the preceding four years (1950-53) was 3 per cent, while that in population is estimated at $1\frac{1}{2}$ per cent. In the result, per caput supplies both of food and of all agricultural products regained pre-war levels. When availabilities of food are examined more closely, some significant regional trends emerge from the world picture. In a comparison of per caput production in 1952-53 with the corresponding pre-war figures, North America stands out with an increase of 17 per cent.—rising to 19 per cent. in 1953-54—an increase unrivalled save in the United Kingdom and New Zealand. The Middle East, Western Europe, and Africa also showed increases, while significant declines occurred in Latin America, Monsoon Asia, and Australia. Unfortunately, the food-deficient areas are also those with the smallest potentialities for increased food production. The danger-points, with declines of more than 25 per cent. in per caput food production, are Malaya, Egypt, and Burma.

While actual agricultural production has increased, trade in agricultural products has remained almost static at the level of the pre-war quinquennium. Only from North America and Oceania have exports increased more rapidly than production. Even then, stocks have been piling up in the United States from 1952 and in Canada from 1953. In the Middle East, agricultural production has risen sufficiently to allow gross agricultural exports to rise above pre-war level, though more is being retained. On the other hand, Monsoon Asia, an area comprising half the world's population and a

quarter of its agricultural production, with a proportion of occupied population in agriculture varying from 60 to 80 per cent., has passed from being a net exporter to being a net importer of food, though in Thailand and Burma rice has latterly been accumulating. Its agricultural production—excluding China—has increased since 1934-38 by only 8 per cent. (1953-54), while the estimated increase for the world as a whole is 19 per cent. Meantime its population has increased by a quarter.

In continental Europe a variety of causes have led to a decline in the volume of agricultural products entering international trade: efforts to rectify balance of payments, priorities to considerations of strategy and strengthening of the general economy, feather-bedding of farmers against unfavourable terms of trade and, at the other end, declining export surpluses in some supplying countries, particularly in Latin America. Sir John Russell places considerable emphasis on what he calls the flexibility of United States agriculture as a major balancing factor in world food supplies. It is true that the United States have been able to meet rising world demand with an almost continuous expansion of production since the late nineteenth century, but on the other hand, when demand has fallen off, shrinkage has not been easy and production stabilisation has been a burden on the United States economy, causing other countries to watch United States disposal of surpluses with considerable anxiety.

The student seeking detail on the agricultural background to the broad trends that are dealt with in the F.A.O. reports will find in Sir John Russell's book a wealth of data on agricultural production and consumption in many countries, including much material of wider application. The author disclaims any attempt at completeness, but it must be said that the reader using the book as a work of reference will find the absence of the U.S.S.R., Eastern and Central Europe and Norway, and the relatively slight treatment of Latin America and the Far East, disappointing. On the other hand, North America, Australia, New Zealand, the Union of South Africa and tropical Africa receive very full, and India-Pakistan fairly full, treatment. In Western Europe, the United Kingdom, the Netherlands, Denmark and France receive the emphasis. The section on Italy has a distinctly pre-war flavour, with a fair account of *bonifica integrale* but nothing about agrarian reform. In the book as a whole there are few references to any literature but that appearing in English.

In country after country it is found that the basic problem is to intensify and diversify production, with closer integration of crops and livestock. Sir John Russell considers that only the modern systems of agriculture allow this kind of intensification, so the transformation of old peasant systems into modern agriculture, accomplished in Britain and Northwestern Europe, must be spread. The small scale of peasant agriculture hinders the necessary accumulation of capital in the areas where this transformation is most needed, and so there is stagnation in these countries. The critical problems are now economic rather than technological. As Lord Boyd Orr remarks, "we have the technical knowledge to produce the food needed. The economic

problems are harder." Neither of these eminent authorities explicitly acknowledges, however, the time-lag involved in the educational process of communicating the results of this technological knowledge through the expert and the local agricultural adviser to the peasant in the village.

Lord Boyd Orr has been one of the most eloquent exponents of the world's food needs. In his latest book³ he presents in very readable form the familiar elements of nutritional requirements, increasing population, soil erosion and possibilities of increasing unit-yields. Perhaps more than any other writer he has made widely known the sombre picture, dating from the earlier years of the Food and Agriculture Organization, of a world in which two-thirds of mankind is hungry. On the other hand, Dr M. K. Bennett, Director of the Food Research Institute of Stanford University, provides in *The World's Food Supply*⁴ a critical analysis of the data, since considerably modified by F.A.O. itself, from which these statements stem. He is also sceptical of the Hot Springs tenet that "the first cause of hunger and malnutrition is poverty", more particularly as regards the latter. Dr Bennett provides a critical discussion of the difficulties of interpreting these highly generalized statistics, both for undernutrition and for malnutrition. For the non-American reader at least, this discussion of international food statistics is probably the most useful section of the book, which also contains three lectures on the history of world population growth in relation to food supplies and a much larger section on the American diet. Throughout this work the author brings his long experience at the Food Research Institute to bear on the interpretation of the facts of consumption. The book is thus a most appropriate complement of Sir John Russell's study of production.

Another assumption that is very commonly made, and apparently by Lord Boyd Orr among others, is that "food for all" would in itself lead to peace and that in the conflict of ideologies food supply will be the decisive factor. At this point we may turn with interest to the view of the situation taken by an Indian economist. Mr Chandrasekhar, like Lord Boyd Orr, assumes that hunger is one of the basic causes of international ill-will—an assumption that is not entirely borne out by a survey of aggressive attitudes in relation to availability of crop land. Mr Chandrasekhar has a five-pronged programme but, judging from the title of his book,⁵ it is the facilitation of international migration on which he wishes to lay most stress. His main point, in fact, is that some relief for the "hungry people", who are, of course, mainly Asia's "teeming millions", should be found in the "empty lands" at present politically inaccessible to them. This is an argument of which we may expect to hear more in coming years. Mr William Vogt, in his preface to this book, cautiously reminds us, however, that many of these areas are "ecologically vulnerable". We may set aside Mr Chandrasekhar's inclusion of "colonial freedom" as a remedy, as, at this time of day, little but political window-dressing. The main interest, at this juncture, of his third point, "universal birth-control", is that it comes from an Asian writer. The remaining two, and probably most practicable, points have a more business-like sharpness. They are

industrialisation and agricultural development, and here we return to the less speculative ground on which this brief discussion opened, with the strong recommendation that the reader will find in the publications there mentioned a rich quarry of well-authenticated factual material upon which to form his opinions on this literally vital world problem.

¹ FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. *The State of Food and Agriculture* 1954. 7s. 6d. *Agriculture in the Near East: Development and Outlook*. 5s. *Agriculture in Asia and the Far East: Development and Outlook*. 5s. *Prospects for Agricultural Development in Latin America*. 5s.

² RUSSELL, Sir JOHN E. *World Population and World Food Supplies*. London: George Allen and Unwin Ltd., 1954. 50s.

³ BOYD ORR, JOHN. *The White Man's Dilemma: Food and the Future*. London: George Allen and Unwin Ltd., 1953. 9s. 6d.

⁴ BENNETT, M. K. *The World's Food Supply. A Study of the Interrelations of World Populations, National Diets and Food Potentials*. New York: Harper and Bros., 1954. \$4

⁵ CHANDRASEKHAR, S. *Hungry People and Empty Lands*. London: George Allen and Unwin Ltd., 1954. 18s.

SPAUVEN, F. D. N. *Decline and Stability in Highland Areas. Planning Outlook*, III (2), 1954. King's College, University of Durham.

In this review of the perennial problem of highland depopulation, areas of recent stability or increase are distinguished from those of continued decline, in the light of the Census results and some of the changing employment and other factors between 1911 and 1951. The author deals mainly with the Highland, Island and Southern Upland parishes of Scotland, but also with some of the changes since 1931 in the 'highland zone' of England and Wales.

Areas of substantial decrease are found to predominate in most highland regions, especially in the far north and west of the Crofter Counties and in much of the Welsh Uplands. But there are a considerable number of areas of increase or only slight change since 1931, notably in the south-west and central Highlands. The main factors found to be responsible for the stability or growth of these exceptional areas are (a) developments in State forestry, motor-fishing, dairying or cattle rearing; (b) temporary influxes of labourers on hydro-electric and water-supply schemes, and of the armed Services in training; (c) accessibility from the lowlands and from urban centres in general; (d) the application of special enterprise and capital to local resources and skills in certain small islands; (e) the communal strength of some remote but still closely settled crofting districts. A feature common to all regions is the growth of highland towns acting as rural service or tourist centres. The smallest towns, and those relying largely on fishing, textiles or quarrying, have in general been static and some have declined.

Looking to the future, the article concludes that although depopulation seems likely to continue in some rural districts it is by no means inevitable in all. Special types of development such as hydro-electricity will have their lasting benefits, but the normal administrative problem will remain that of applying limited financial resources and means of development to selected areas where economic advantage coincides with some social stability.

THE WEST HIGHLAND SURVEY: A REVIEW

IN the past decade there have been an increasing number of regional and district surveys of the Highlands, often with a planning or policy aim in view. By far the fullest of these has been Dr Fraser Darling's investigation into problems of the West Highlands and Islands, carried out from 1944 to 1950 with a number of collaborators and with the assistance of the Development Commission and the Department of Agriculture for Scotland. The publication of this survey, after some delays, will be welcomed by geographers and indeed by all students of Highland affairs. The full data for the 1,040 crofting townships and 71 parishes which formed the basis of the survey is being deposited in a number of libraries. The book itself, in which this material is mostly presented by 'provinces', is a mine of information, illuminating observation and far-reaching conclusions; its bulk is offset by clear presentation and style, and by the inclusion of numerous diagrams and cartograms. Those who find that parts of it are essentially a personal testament or that it has shortcomings as a truly regional synthesis will be challenged to argue and to fill the gaps from other sources or by new research.

The Survey was attempted from what was thought to be "a still uncommon standpoint, as an essay in human ecology". Dr Darling makes it clear at the outset that "the foundations on which this Survey has been built are the soil, the sea and the natural resources on which the human population is finally dependent". Thus the report begins with a brief historical résumé of the Highland problem; proceeds to outline the remarkable diversity of terrain and its human use in ten convenient provinces; systematically analyses population changes and structure; examines the ecology of land use and the agricultural situation, and reaches the conclusion that the Highland habitat has been largely devastated by climatic change, erosion, a millennium of fire, saw, and tooth, and a breakdown of the earlier conserving practices of a cattle-dominated subsistence agriculture; and finally deals with the manifold aspects of the social situation. The area lies for the most part west of Drum Albyn and north of the Firth of Clyde. This means that it is both more and less than a study of crofting—more because it compares 'the deep crofting areas', where there are still 11,000 crofter holders, with terrain and agriculture in and south of the Great Glen, where there are now barely 1,000 crofters left—less because it excludes some 7,000 part-time and spare-time units from Zetland to Strathspey. The external relations of the region are inadequately treated and the distribution of the 1,040 townships is not mapped.

An exhaustive analysis by parishes is made of the rise and decline and the changing age and sex structure of the population. The total population has fallen from a maximum of 201,000 in 1831 to 119,000 in 1951, almost the same as it was in 1755. Since about 1900 the decline has been due in an increasing number of rural districts to an excess of deaths over births as well as to continuing emigration. These trends are most pronounced and offer the gravest prospects for the future on the North West mainland and most of the Inner Hebrides, whereas in

the Outer Hebrides decline has so far been less serious. It is thought that the situation will continue to be promising in many parts of the Argyll mainland, the Fort William area, and 'Inner Sound' (from Mallaig to Kyle).

The factors chiefly responsible for these changes are discussed. In the difficult zone of the North West and Inner Hebrides they are given as isolation, critically low density of population, concentration on pastoral farming and physical and biological deterioration. To these might be added the absence of ancillary occupations in a majority of the townships, which is revealed by the Survey, and the lack of accessible towns. It is, however, one of the basic principles of the Survey that "notions of industry and work unconnected with the soil" are of little account. The stabilising influence on the region of migration, normal age structure and natural increase in and around the towns and larger villages since 1931, and the rural services and employment opportunities developing there, have been ignored or assumed to be to the detriment of the rural population. Following the work of Dr Arthur Geddes the authors emphasise that simple mutual aid and communal living within the concentric groups of family, work team and township is natural to the Gael but that the more complex fields of co-operation with the outside world have been slow to develop. One result of this is shown to be that when wider contacts are suddenly made, for example by the opening of new roads, some communities become too much tied by the neck to urban 'centres' in the east and south, as indeed became clear in the snowstorms early this year. Is not one answer to both these problems to accept urban influence but to try and promote its growth in small service and industrial centres at strategic points in the north and west?

A survey such as this does not provide a master plan for rehabilitation, but a comprehensive scheme for the small island of Coll is included and gaps and anomalies in administration with regard to the Hydro-Electric Board, the Forestry Commission, the Department of Agriculture for Scotland and agricultural education are mentioned. Co-operation between these bodies and the Nature Conservancy in research and wise management of hill slopes under 2,000 ft. is called for. Finally, the general conclusion is reached that "effective rehabilitation will call for an organisation with executive authority, able to act in several fields" and which will not neglect scientific and humane studies. Many of the findings of this Survey have subsequently been recognised by the Commission of Enquiry into Crofting Conditions. The new Crofters Act should provide the practical basis for many of the reforms in crofting agriculture, and the Forestry Commission is trying to find and acquire more plantable ground, especially in the exposed, rugged and soil-depleted provinces of the North West and the Inner Hebrides where the social and ecological need is greatest but the timber return is less certain.

¹ *West Highland Survey. An Essay in Human Ecology.* Edited by F. FRASER DARLING. 9½ x 6½. Pp. xviii + 438. 71 tables. 37 figs. 2 plates. London: Oxford University Press: 1955. 30s.

THE TIMES ATLAS : A REVIEW

A. C. O'DELL AND COLLEAGUES

A NEW edition of the *Times Atlas* has long been awaited and in view of its reputation a high standard of production is expected. Technically this first volume on Northern Europe¹ is a magnificent example of printing. Only occasionally are there press blemishes, and the printing houses of Bartholomew and Clowes are to be congratulated on the skill of their workmen. In a geographical magazine one is entitled to pay more attention to the geographical and cartographical techniques than to the printing, and in these fields there will undoubtedly be differences of opinion.

The Preface praises the layer technique for immediately conveying "an idea of the height of the land". Surely slope is often of more significance than the absolute height? A style which incorporated a modern form of relief modelling would have produced maps which showed more vigorously the pattern of relief in the Alps. The layer tints are delicately adjusted but the producers have not taken into account the great number of people—about one in ten of the male population of Britain—who are to some extent colour blind and the greater number who will have to try to differentiate the varying buff shades in artificial light. While a map producer has to steer between strong tints, which may obscure names, and weak tints, which appear weak, the feeling of many will be that these layer tints are too slight and that a more vigorous colouring, such as was used on the revised edition of the Ordnance Survey map of *Roman Britain*, would have been advantageous. Delicacy of tints can produce an attractive map but the sheets of France show how more emphasis is needed. The maps covering the north-east and south-east fail to give a clear enough view of the Paris Basin or of the Massif Central. The tints may be based on scientifically surveyed contours but they do not provide a vivid optical impression. It is instructive to compare these relief maps with comparable sheets in the *Atlas de France* or that of Denmark in the *Atlas over Danmark*. Only on Plate 54, with the submarine contours, is there any real strength of colouring, and at once the map acquires character. Incidentally, why are the contours on Plate 66 marred by being marked with a series of black dots?

The Preface claims that no countries are given preference by scale except where "greater density of population, degree of development or geographical interest justifies it". Experience in three British University Departments of Geography has shown that more wear and tear occurs in the 1922 edition of this atlas with the maps of the British Isles than with other sheets and, on all counts listed in the Preface, a scale larger than 1 in 850,000 could be justified for Great Britain, particularly when the Netherlands, at the cost of two irritating inset extensions, is given 1 in 500,000. Whether it is scale or approach the Low Countries are provided with much more detail, including information about woodlands.

In a large work of this character inaccuracies and inconsistencies are inevitable even if not readily explicable. Attention naturally turns towards the British maps as a test of the factual material, and in these plates one is surprised to find errors and what can only be regarded as wrongful selection. For example, why Dunreay for Dounreay in Caithness, why Bournemouth (which includes Winton and Boscombe) shown as a smaller urban unit than Inverness, why cross marks on certain railway lines and not others, why no airport marked at Campbeltown, why in Kintyre the farms of Dippen and Gartnagrenach named and not Carradale which has a population of several hundred persons, why in the Shetland Islands is the long-deserted settlement of Garthbanks named? Selection of roads is always a major problem, but on Plate 57 one looks in vain for the road to Mossbank which connects the North Isles to Lerwick or the road to Applecross whereas similar roads elsewhere are indicated.

This atlas offers many advantages in clarity of lettering and convenience when it is compared with its contemporary continental equivalents. Issue in five volumes is an aid to handling, but individuals, if not institutions, are bound to feel that the price is excessive. Costs of production are high but, without a British competitor, so should sales be relatively great, and individuals cannot but feel that twenty-five guineas for 120 plates is prohibitive for a general atlas without specialist plates, even though long use should be ensured by the high-quality paper. The gazetteer has been random checked and appears accurate. Difficulties of spellings of place names are seen: under Copenhagen the reader is referred to Köbenhavn, but for Baile Atha Cliath back to the English form Dublin. The Sound is only listed under Öresund but pingvellir is indexed under Thingvellir. Despite these points of criticism this atlas is a landmark in such productions and for years to come will remain the standard of its kind and be looked to as the most authoritative British atlas for general reference purposes.

¹ *Times Atlas of the World*. Mid-Century Edition. Edited by John Bartholomew, M.C., M.A. Volume III—Northern Europe, with an Index-Gazetteer. 19½×12½. 72 Map Plates+57 pp. Index. London: The Times Publishing Co. Ltd. 1955. 5 guineas.

‘Changes in Population Distribution in the County of Fife.’ By JOHN C. DEWDNEY. *S.G.M.*, 71 (1): 27-42.

The estimates of future migration of population into the Fife coalfield from Lanarkshire, totalling nearly 75,000, which were made on page 42, paragraph 2, of this article were based mainly on estimates of mining employment and population change given in the *Regional Plan for Central and South East Scotland* (1948), and in particular, on the assumption that the ratio of total population to new miners should be 8:1. It is understood that the authorities concerned consider that the scale of immigration and population increase will be very much less than that suggested by Dewdney, because much of the desirable balancing population is already resident in Fife. The number of miners and the total population have already grown considerably since the estimates in the Mears Plan were made, and the effects of natural increase, local recruitment to the mining industry and future redundancies in Central Fife have to be taken into account.

REVIEWS OF BOOKS

EUROPE

The Domesday Geography of Midland England. Edited by H. C. DARBY and I. B. TERRETT. 9½×6½. Pp. xv+482. 159 maps. Frontispiece. Cambridge: Cambridge University Press, 1954. 55s.

This, the second of the *Domesday Geographies*, follows a plan similar to that of the first. Eight authors have worked under the editorship of Professor Darby and Dr Terrett. The extraction and geographical interpretation of material from the Domesday folios calls for a very specialised technique usually associated with historical scholarship. Geographers, most of whom are not fortunate enough to possess such training, and other lay readers, cannot but admire the skill and ingenuity displayed by Professor Darby's team. Scottish readers will, in addition, regret that no similar record is available in their country.

For each county the same plan is adopted. The boundaries are carefully defined and disparities with their modern equivalents noted. Evidence relating to population and settlements is surveyed, summarised and mapped. The eleventh-century population was essentially agricultural, and largely locally self-sufficient; the evidence is therefore concerned with the identification of settlements, with the distribution of arable land and plough teams, and with values. It is here that the terminology of the Domesday clerks is most complicated. But the non-expert reader need have no fear; even those whose little Latin has long deserted them will find little difficulty. Similarly Woodlands, Meadows, Fisheries, Mills, and Churches are in turn surveyed, together with such other subjects as from time to time appear in the folios; the evidence is examined and commented upon. Occasional sidelights on contemporary urban life, and in Worcestershire the importance of salt works, are also noted. In all cases the difficulties and uncertainties of interpretation are indicated and, lastly, a summary based on physical regions concludes each county chapter.

In the final chapter Professor Darby surveys the nine counties as a whole, again treating of the nature of the record and its uncertainties before placing the whole in its geographical setting. Some repetition is inevitable but, whilst the county chapters are invaluable for their wealth of detail, this final chapter will probably be much more widely read and, not least, by those who do not require the county detail.

Whilst the Domesday record has been much used by historians of varying interests, geographical interpretation of this magnitude has never before been attempted; the work should be of value to historians and geographers alike, and of interest to many others. The writing is clear and to the point. There is a wealth of cartographic illustration—generally in uniform scales to aid county to county comparison; the use of a blue plate for certain maps is particularly to be commended and one wishes it had been used more often. The high quality of the scholarship is matched by that of the production of the book itself—and also, unfortunately, by the price.

H. A. M.

Nottinghamshire (The County Books). By C. MARSDEN. 9×6. Pp. v+325. 49 plates. 1 map. London: Robert Hale Ltd, 1953. 18s.

"It is because it is nothing special that Nottinghamshire claims special interest." With these words the author justifies his book about a representative English county which, although not striking in any particular way, nevertheless holds within its boundaries a variety of typical English landscapes.

The reader will find this an attractively written account of Nottinghamshire (perhaps somewhat weighted on the side of architecture and anecdote), and the chapter on D. H. Lawrence can be particularly recommended to those interested in the regional novel. The excellent set of photographs will give the stranger a balanced impression of the county's architecture and landscape, both urban and rural.

R. H. O.

The Royal Burgh of Ayr: Edited by ANNIE I. DUNLOP. 9×5½. Pp. v+342. 5 plates. Edinburgh and London: Published for Town Council of Ayr by Oliver and Boyd, 1953. 12s. 6d.

This book has been divided into a logical sequence of chapters each written by specialist contributors. It represents a considerable volume of work and as a historical guide is most comprehensive. The geographer will find the chapters on the growth and development of Ayr the most useful, although apart from the "Street Plan of Ayr (1534-1624)" the illustrations are disappointing. R. C.

Europe and the Mediterranean. By N. J. G. POUNDS. 10×7½. Pp. vii+437. 246 figs. London: MacGraw-Hill Publishing Co. Ltd, 1953. 42s.

This is designed as a college text book, and is comparable in standard to other works recently produced by European geographers for the American market; it is thoroughly up to date, and gives a clear picture of the geography of Europe at the present time. Professor Pounds has included a very large number of excellent diagrams and photographs, though these are somewhat unevenly distributed; for example, the chapter on the U.S.S.R. has not a single photograph, while elsewhere the photographs are not always to the point. From some of the block diagrams, one might suspect that American students will gain the impression that the European landscape consists mainly of drumlin country.

The inclusion of the lands surrounding the Mediterranean is a welcome feature and the book as a whole should be a useful addition to the general introductory literature on European geography. A. MacP.

The Evolution of Germany. By J. A. HAWGOOD. 6½×4½. Pp. ix+206. 21 maps. London: Methuen and Co. Ltd, 1955. 8s. 6d.

This is a book written with considerable sense of geographical aspects and obvious feeling for German landscapes. The author has drawn on some sources familiar to students of geography and for its size the volume is very well provided with maps. As a whole the book is a *tour de force* in compression.

It covers the ethnic and economic development of Germany from pre-history to the present day. The problem of German unity is examined in reverse historical order, starting from the Third Reich, and Germany's reactions to general European movements are discussed in conclusion. As almost inevitable in compression of this degree there are generalisations that may not be acceptable without considerable qualification but the many suggestive ideas and comparisons should stimulate the thoughtful reader. C. J. R.

Czechoslovakia: A Geographical and Historical Study. By Harriet Wanklyn (Mrs. J. A. Steers). 8½×5½. Pp. vi+446. 77 figs. 4 end paper maps. London: George Philip and Son Ltd, 1954. 39s.

Mrs Steers has provided English-speaking geographers with what is obviously the long-awaited standard text on Czechoslovakia. From a wide range of sources, supplemented by first-hand acquaintance with her subject, she has skilfully compiled a readable and informative account of the country.

The book consists of an introductory chapter followed by eight others on Regional Geography, Climate, Vegetation and Soils, History, Farming, Industry and Trade, Communications, and Population and Settlement. These are each split into two sections dealing respectively with 'Western Czechoslovakia' (Bohemia and Moravia-Silesia) and 'Slovakia'—a division warranted by the separate development of these two units until 1918. The further detailed sub-division of each half-chapter into topics is perhaps less essential, however. The final chapter deals with the lost province of Sub-Carpathian Russia. The text is illustrated by maps, ranging in subject from geology to religion, and by numerous photographs, including some useful aerial views.

In two minor respects the reader may be disappointed. A summary bibliography incorporating all the references given at the end of the chapters would have been useful and so would a guide to the pronunciation of place-names.

R. H. O.

Cornwall: An Illustrated Essay on the History of the Landscape. By W. G. V. BALCHIN. 9½×10½. Pp. xi+128. 13 figures+1 general map. 61 plates. London: Hodder and Stoughton Ltd, 1954. 16s.

In this excellent little book the author provides a concise explanatory account of the landscape of Cornwall. While the second chapter might have been fuller in its content, those following are comprehensive and satisfying. Appropriate diagrams and photographs illustrate the text but, unfortunately, indifferent reproduction does not do full justice to the latter.

R. C.

ASIA

What the World Showed Me. By PER HØST. Translated by K. Johnson. 8½×5½. Pp. 223. 69 plates (13 colour). London: Methuen and Co. Ltd, 1953. 18s.

Most of this book is concerned with the beautifully-harmonious life of little-known Indian tribes in the jungles of Darien. The Norwegian author's acute observation and kindly understanding of primitive peoples, allied with his keen sense of humour, put this book in the highest class, alongside Grimble's *Pattern of Islands* or Mowat's *People of the Deer*. The additional chapters on Arctic seal-hunting and the wild life of the Florida Everglades and Barro Colorado, for all their fascinating detail, almost disrupt the unity of the book's central story. The photographs are excellent.

D. J. M. H.

Forerunner to Everest. By R. DITTERT, G. CHEVALLY, R. LAMBERT. Preface by Sir J. Hunt. Translated by M. Barnes. Pp. 256. Maps and sketches. London: George Allen and Unwin Ltd, 1954. 15s.

Our Everest Adventure. By Sir J. HUNT. 9½×7½. Pp. 128. 150 figs. and maps. Leicester: Brockhampton Press Ltd, 1954. 12s.

South Col. By W. NOYCE. 9×6. Pp. xvi+303. 16 sketches. 52 plates (4 coloured). 5 maps. London: Heinemann, Ltd, 1954. 21s.

Alone to Everest. By E. DENHAM. 8½×5½. Pp. 255. 13 figs. 4 maps. London: Collins, Sons & Co. Ltd, 1954. 16s.

Forerunners To Everest will form a valuable addition to the bibliography of Everest. The translation, illustrations and diagrams are all excellent. The book demonstrates again that High Himalayan Expeditions during or after a monsoon have much less chance of being successful than those before the monsoon. The privations suffered by the second expedition were great. On the other hand, the non-mountaineer who wishes to get a general account of the 1953 Everest Expedition will find Sir John Hunt's book excellent. It does not go into great detail but the illustrations are excellent and the non-climber, for whom the book can be highly recommended, will obtain from it a very good picture of the whole expedition.

South Col., giving a vivid record of the author's actions and reactions from day to day, gains in interest as compared with the official history of the Everest Expedition. On first thoughts it might be considered that such a book could add nothing to the history of the Expedition which has been written by Sir John Hunt but the reader will appreciate clearly the stresses and strains of such an expedition and its effect on the individual members of the team, and so it forms an excellent supplement to the official history. There are interesting thumb-nail descriptions of the various members of the Expedition. Besides the excellent photographs, there are black and white drawings by A. J. Veilham.

It is difficult to imagine how a man who apparently had made a close study of mountaineering literature and who, as related in the first part of the book, had climbed a few tops in Central Africa where there were neither snow fields or glaciers, imagined that he could, with two Sherpas, climb Everest. *Alone To Everest* tells how he did succeed in entering Tibet by doubtful methods and how, luckily for him and his two companions, bad weather well below the North Col made him abandon the expedition. Earl Denham has apparently a considerable knowledge of ornithology and this adds some interest to the book.

A. H.

AMERICA

Viking Times To Modern. The Story of Swedish Exploring and Settlement in America. By E. W. FLEISHER and J. WERBULL. 10½ × 8. Pp. 115. Photographs and figs. Stockholm: Almqvist and Wiksell. Minneapolis: University of Minneapolis Press, 1953. \$4.50.

This is a short succinct account of the attempts by the Vikings and later by the Swedes to explore North America and establish colonies there in pre- and post-Columbian times. It also covers the political relations between the U.S.A. and Sweden, particularly during the American War of Independence, the Anglo-American War of 1812-14 and the Civil War. It provides a brief survey of the emigration of Swedes during the nineteenth century, where they settled, and how they lived, and concludes with a summary of modern commerce, especially in the iron trade, between Sweden and North America. The work is of use to both economic and political geographers and has some new and useful maps. It fails to quote many of its sources, however, and in other respects is rather cursory. J. W. W.

Geography of North America. By G. J. MILLER, A. E. PARKINS and B. HUDGINS. 8½ × 6½. Pp. vii + 664. Maps, diagrams and photographs. New York: Wiley and Sons Inc. Third edition, 1954. 60s.

The Pacific Northwest. By O. W. FREEMAN, H. H. MARTIN, et al. 8½ × 6½. Pp. 540. 24 plates. 59 maps and diagrams. New York: Wiley and Sons Inc. Fourth edition, 1954. 68s.

Regional Geography of Anglo-America. By C. L. WHITE and E. J. FOSCUE. 10 × 7½. Pp. vii + 518. 230 figs. 15 tables. London: Constable and Co. Ltd. Second edition, 1955. 57s. 6d.

These are new editions of three well-known texts. Much of the *Geography of North America* has been rewritten, with new material, statistics, maps and pictures. A short section on the general geography of the continent, which suffers from the frequent intrusion of systematic principles into what might well have remained a straightforward regional description, is followed by a consideration of the major regions of the U.S.A., Canada, and Mexico. This treatment tends to obscure the geographic integration of regions across political frontiers, a fact of utmost importance in the real geography of the continent. The successful features of the book are its clear style, well-organised matter, the use of 'selected type areas' with which to illustrate the characteristics of major regions, and the constant appeal to history as well as to geography in explaining the human development of the continent.

The new edition of the now classic work, *The Pacific Northwest*, was called for by the many considerable changes in the economic and human geography of the region during the last decade. It is one of the most rapidly developing areas of North America in terms of new mining, lumbering, farming, hydro-electric and manufacturing activities, and population growth. Some thirty authors, of whom thirteen are new contributors, have collaborated, each writing up the topic or area of his special knowledge and research. The result is a series of brief, factual, authoritative essays, providing the definitive word on their subject. These have been given an astonishing unity through skilful editing, so that there is a clear development of theme and narrative. It is a pity, however, that the treatment was not fully regional, at any rate in the physical geography, where the description of major features, running north and south, has been obscured by writing in terms of political units that run west and east. However, in the human geography a proper emphasis on different political, social and economic developments has been observed. Climate, stated to be "the most important environment factor in the Pacific Northwest" is nevertheless accorded only half the space devoted to physiographic regions. The economic geography has been overstressed, and one would like to see more on rural settlement, an expansion of the section on urban communities, and an appraisal of the effects of modern political geography on population and standards of living.

The Regional Geography of Anglo-America is a complete revision of the by now well-known text on the English-speaking countries of North America. The authors sent each chapter to experts on the regions described and have in every way sought to

make their information true, factual, and telling. They have made out a good case for their regional divisions, in the delineation of which one welcomes the use of both physical and economic factors. The former are made the basis of division in the north and west, while the latter are adopted in the east, centre and south. Thus the reader becomes conscious, where appropriate, alike of physical 'controls', and of human achievements. The chapter on cities is particularly welcome now that both the U.S.A. and Canada have become so highly urbanised. More space has also been devoted to Canada and Alaska, which is specially valuable in view of the current, rapid expansion into the north. Altogether this is an accurate, balanced, interesting account of northern North America, invaluable for our times when English-speaking peoples are being drawn ever closer together. J. W. W.

Les Antilles. By E. REVERT. 6½ × 4½. Pp. 220. 10 figs. Paris: Armand Colin, 1954.

The problems of the Caribbean are now forcing themselves on the attention of the British public in a way that even most British students of the area little expected. In this short but readable account Professor Revert more than maintains the admirable standards of this series. After a very brief survey of the physical and historical background, he gives essential facts on the population and resources of the individual islands, with chapters for the five political groups. His well-balanced and realistic account of the racial situation and of some postwar tendencies, coming from a writer of different tradition but with apparent sympathy for British empiricism, will be read with interest. The author touches on some of the unexpected complications following increased United States intervention in the area. In conclusion he draws attention to some of the common features in the Caribbean tradition from Louisiana to Guiana and has some interesting remarks on the possibilities of syncretism not only in primitive religion but in modern administration. C. J. R.

Symposium on the Geography of Puerto Rico. Edited by C. F. JONES and R. PICO. 9½ × 6½. Pp. xxviii + 503. 186 figs. 13 plates. Rio Piedras (P.R.). University of Puerto Rico Press, 1955.

During the last two decades Puerto Rico has been subjected to a more systematic study than any other area in the Caribbean. The latest volume, edited by the chairman of the Geography Department of Northwestern University and the chairman of the Puerto Rico Planning Board, is a collection of papers arising from the Rural Land Classification Programme of 1949-51. It is claimed that the thoroughness of the survey is unmatched elsewhere in the tropics. Eighteen field teams, each consisting of two advanced graduate students from geography departments in the U.S.A. and one Puerto Rican interviewer covered 3,421 square miles in 220 man-months of work. These studies of crops or industries, land use in certain areas, and settlement types are in large part based on the field work, which also provided data for 18 Ph.D. theses. There may be a moral here for the Colonial Office as well as for British Universities. C. J. R.

CLIMATOLOGY

The English Climate. By C. E. P. BROOKS. 8 × 5½. Pp. vi + 213. 27 figs. London: English University Press Ltd, 1954. 12s. 6d.

Further Outlook. By F. H. LUDLAM and R. S. SCORER. 8½ × 6½. Pp. 174. 25 figs. 13 plates. London: Allan Wingate Ltd, 1954. 15s.

These two books form a useful addition to the semi-popular literature on meteorology and climate. Although both are, in part, concerned with an up-to-date interpretation of certain aspects of weather, they break new ground in different and interesting ways.

The English Climate falls roughly into three parts. The first part is devoted to a most valuable and lively explanatory description of the distribution of the major climatic elements in Britain—treated dynamically and with due attention to seasonal incidence and illustrated by numerous examples. In spite, however, of the title many of the maps cover the whole of Britain, while by a curious error in Figure 1 a map entitled 'The Gulf Stream' shows both this stream and the North Atlantic Drift.

The chapter on 'Local Climates' is particularly valuable in view of the limited general literature available on this subject in English. A short middle section in which Dr Brooks considers some of the physiological and other practical effects of climate is marred by his rather uncritical quotations from Ellsworth Huntington on the dangerous topic of climate and the human character. The last part of this book deals with seasons, spells of weather and weather cycles and includes a detailed account, chronologically arranged, of the weather likely to be expected in the course of each of the four seasons. In the final chapter the author discusses the *Daily Weather Map* both in its published and televised form.

In the foreword Sir David Brunt refers to the new and refreshing standpoint from which *Further Outlook* is written. It opens with chapters on, 'The Weather we Observe', 'Atmospheric Processes' and 'The Turbulent Atmosphere', and these subjects are interpreted with a minimum of technical language and practically no mathematics. These, and later chapters on 'The Art and Science of Forecasting' should make a useful contribution to the layman's understanding of processes of weather and the limitations of forecasting. Among novel features are a chapter on 'Exploiting the Atmosphere'—largely concerned with gliding—and one on 'Weather Control' which includes modifications of the microclimates by artificial heating, frost protection and fog dispersal, as well as the more ambitious artificial rain-making by the 'seeding' of clouds.

C. P. S.

Glacier Variations and Climatic Fluctuations: Bowman Memorial Lectures. Series three. By H. W. S. AHLMANN. 9x6. Pp. v+51. 11 figs. 4 plates. New York: American Geographical Society: George Grady Press, 1953. \$2.50.

In the foreword to this publication the reader is informed that this, the third Bowman lecture, "brings together the findings of the human and physical geographer the geomorphologist and even the historian". In fact, the author has accomplished far more in his stimulating lecture. Using relatively simple terms, and within a limited space, Dr Ahlmann's carefully presented and selected text covers the academic and practical, as well as the historical and topical, problems of his subject.

R. C.

BIOGEOGRAPHY

The Soils of Europe. By W. L. KUBIĚNA. 10½x7. Pp. 318. 21 plates (coloured and black/white). London: Allen and Unwin Ltd, 1953. 75s.

While primarily designed as a guide book for those with a specialist interest in soils this book will also be of value to geographers who need to identify soils in the field or who undertake university courses in biogeography. For field workers Professor KubiĚna has built up a series of keys which lead to the determination of soil types from such simple initial observations as soil colour, chalk content and reaction of the top soil, or the character of the parent material. For those who wish a fuller description of particular soils or who are studying the soils of Europe as a whole there is the superbly illustrated 'General Key'.

In this, the major portion of the book, Professor KubiĚna classifies soils according to his 'natural system'. Within the major groupings of sub-aqueous, semi-terrestrial and terrestrial soils he classifies soils after, "not a few, but after all characteristics . . . and also after their mutual interrelations". This involves a rather detailed consideration of humus forms and of sub-divisions within the soil profile, but the skilful way in which the system is constructed makes it possible for individual workers to consider or omit much of the detail according to their particular interests.

One feature, however, which may at first cause some dismay is the use of a large number of unfamiliar names. In an effort to evolve a system of soil nomenclature which will be internationally acceptable a much needed study has been made of the terms at present used in different countries for strictly similar soils. It is a pity that the system evolved from this, though based on existing names and giving full references to synonyms, is so markedly polygot. Its acceptance or otherwise will have a limiting effect on the usefulness of the book which is potentially a valuable source of reference for workers in a wide range of the natural sciences.

A. A. M. H.

Soil. By G. V. JACKS. 8½ × 5½. Pp. ix+221. 7 figs. 10 plates (3 coloured). London and Edinburgh: Thomas Nelson and Sons Ltd, 1954. 12s 6d.

Soil management, and, consequently, soil fertility and structure are the basic themes behind this brief title. The first seven chapters are devoted to an account of the chemistry, physics and biology of the soil which is more detailed than will be required by most students of geography.

The second half of the book emphasises the roles of plants and man in the formation of soils. The chapter on soil erosion is a lucid and concise statement of the problems involved, and most of the material under the headings of 'Cultivation', 'Forest Soils', 'Plant-made and Man-made Soils', and 'The History of British Soils' is also of direct interest to geographers. Soil classification is treated briefly and critically and suffers somewhat from over-condensation, particularly in the consideration of soil surveys. The author's declared interest in this book is not of course in abstract conceptions of soils, but in the study of soils as "what plants grow in", and especially in how men transform soils to increase their productivity. From this point of view alone the book deserves careful attention from geographers.

A. A. M. H.

Vegetation and Watershed Management. By E. A. COLEMAN. 9½ × 6½. Pp. xiii+412. 6 figs. 16 plates. New York: Ronald Press Co., 1953. \$ 7.

This is an appraisal of the rôle of vegetation in the control of river water supplies, and being an American study gives high priority to the closely allied problems of flood and soil erosion control within river catchments.

Clever mapping has combined the natural tree and grass types of the U.S.A. with the agricultural practices such as irrigation, row crops, mixed agriculture, and has attempted to trace how the total rainfall for each region is disposed of by storage, retention in the soil, evaporation, and to indicate the destructiveness of the surface run-off in terms of floods and erosion from each of these regional types of plant cover. Chapters are devoted to crop rotations, and also to the effects of burning in both forest and grassland, the dwarf *chaparral* woodland of Northern California and the steep scrub and grasslands of Northern Utah yielding some spectacular figures of erosion damage following fires. The effect of continuous, heavy grazing on lands with a low rainfall is also closely correlated with increasing erosion and poorer water deliveries of usable water. The contribution of tree-covered lands to water deliveries is shown to be a secondary consideration where the presence of the forest is the only guarantee against heavy soil erosion, but a good assessment is made of the relative value of tree covers. 'Fringing forests' in low rainfall areas do of course demand a big share of the precipitation, but the drastic cutting down of fringing forest to release a larger water supply has inevitably led to worse troubles wherever it has been attempted.

One could have wished for a statement of empirical findings, but the author shows clearly that every catchment must be analysed on its own merits, in order to determine the permissible land uses and the extent to which they can be integrated where the yield of *usable* water is important. A similar study for Scottish conditions is badly over-due, but is handicapped by the almost complete absence of reliable data of water yields from peat moorlands, reclaimed peat, afforested moorland, and the effect on them of phenomenal storms.

R. MACL. G.

HUMAN GEOGRAPHY

Les Fondements de la Géographie Humaine: Tome III. L'Habitat. Conclusion Général. By MAX SORRE. 10 × 6½. Pp. 499. 32 figs. Paris: Armand Colin, 1952. 1,500 Fr.

In this final, yet independent volume, Sorre has concluded the great work which commenced with Tome I, on *Les Fondements Biologiques* [*S.G.M.*, 1949, 65(2): 108-9], and was succeeded by the double tome on Economic Geography [*S.G.M.*, 1950, 66 (3-4): 186]. The themes of this volume, commencing with the idea of 'Modes of Life', continues by studies of rural and urban habitat to that of metropolises. In the conclusion Sorre has sought for the determining principle leading to the dominance

of one mode of life—or of an association of modes. Thus 'mode of life' is seen as the intermediary to the action of natural environment on mankind. The text then develops the ideas set down in his map of Focal Regions of Civilisation in Eurasia—the drawing of the boundary at the Indus-Ganges west parting; the sundering of these by the cultures of steppe and desert; and the diversity formed by the circumferential belts of mountains and hill-foot plains.

Throughout the book there is a sense of values. Sorre is no facile optimist; he faces reality in his first volume with its geographical study of disease, and here in his reference to the threat of war. Yet he ends, "The profound and exalting feeling of human unity, of an immanent moral unity which respects the rich diversity of cultures—such in the end is the gift brought by human geography to men of good will."

A. G.

EDUCATIONAL

Africa: Studies and Exercises in Human Geography. By D. C. MONEY. Illustrated by W. R. Dalzell. 11 × 8½. Pp. 48. 85 figs. 82 plates. London: University Tutorial Press Ltd, 1955. 3s. 9d.

This, the first of a series which is to include volumes on Australasia and Southern Asia, is a most interesting attempt to provide material for the study of human geography at school level. After an introduction sketching in the broad physical aspects and introducing the peoples of the continent, areas from each natural region are studied, their general geography and human activities being described with illustrations which include air photographs, maps, cross-sections, graphs, and a series of detailed and most informative drawings. At the end of each regional section there follow questions and exercises whose standard suggests that they are intended for good post-intermediate classes.

A. D.

Geographical Film Strips. Educational Productions Ltd, Wakefield.

The following list, giving title, number of strips, and number of frames in brackets, are, with relevant teaching notes, available to members in the society's library:—

Mapstrips, Europe, 1. (24): *The Geography of the Balkans*, 1. (48): *Iceland*, 3 (50) (26) (27): *Sweden—The Country and its People*, 1. (50): *Everyday Life in Greece*, 1. (39): *The Geography of South Africa*, 2. (42) (41): *Everyday Life in East Africa*, 1. (36): *The Sudan*, 1. (48): *Zande Tribe*, 1. (45): *Everyday Life in Syria and the Lebanon*, 1. (38): *East Pakistan*, 1. (42): *Canada—The Shield and the North*, 1. (34): *The Geography of Chile*, 1. (53): *Australia*, 3. (35) (36) (37).

So much of the teaching of geography in the earlier years is concerned with the description of distant and unfamiliar scenes that some form of visual aid is almost indispensable if full and accurate representations are to be achieved. Film strips can impart to lessons a sense of reality and presence difficult to obtain by more orthodox illustrations. At more advanced levels, the film strip can, by its own construction, demonstrate the various approaches to territorial studies, and can illustrate aspects of geology, climatology and the other sciences peripheral to geography with great vividness and clarity. To fulfil such functions, the film strip must obviously be more than an assemblage of vaguely relevant photographs: each illustration should earn its place by offering tangible teaching material, and should also constitute part of a planned sequence which systematically develops the theme of the strip.

Such desiderata may seem so fundamental as to be self-evident, but not many of the strips under review satisfy all of them. The *Geography of Chile* comes nearest to doing so, with its logical approach, almost complete coverage of significant material, and simple, uncluttered maps.

The 'Everyday Life' coloured strips, while containing many good individual frames, lack the organisation that would fit them for use with senior classes. They are generally of a 'travelogue' standard, supplying local atmosphere with some incidental geographical data. Of the Pakistan and Iceland series, also in colour, the former would again be improved by a more systematic approach, while the latter is of a higher standard, and should prove of value to those who can afford the time to study this region. Also, the system employed does not consistently produce convincing colour values. The most satisfactory of the remainder are those which,

as in the series on Australia, South Africa and the Sudan, follow a logical course. Minor defects in these, and others, are the use of photographs which occupy only part of a frame or are taken from rather distant view points. *The Geography of the Balkans* suffers from a surfeit of town views from which little can be learnt, but aspects of climate, vegetation and economic development are adequately treated. On the other hand, *Sweden—The Country and its Peoples* includes some photographs of geographical significance from a number of tourist landscapes—all seemingly in arbitrary order.

The teaching notes accompanying these strips are generally very helpful and informative. A. D.

ATLASES

Kultur-Geografisk Atlas. By J. HUMLUM. 10½ × 7½. I. Atlas. Pp. xx+127. II. Tekstbånd. Pp. 302. Copenhagen: Glydendalske Boghandel Nordisk Forlag. 3rd Ed., 1955. Danish kroner 20.50 (19.50) and 31.50 (26.50), cloth and paper bound respectively.

Professor Humlum's Atlas of Economic Geography will already be known to some teachers of geography and others interested in world production and trade in raw materials. In this new edition the text, which was formerly placed opposite each page of maps, has been re-written and issued in a separate volume. The page size has been reduced, since only one world map now appears on each page instead of two; and many new maps of smaller areas have been added. The text volume is itself well illustrated by maps and photographs, but its use in this country will be limited until—as we may hope—it becomes available in English. But the Atlas volume, which is obtainable separately, is in Danish, German, French and English, and, moreover an English edition is available at a remarkably reasonable price.*

The maps of world distributions are all at 1 : 225,000,000 scale and generally show production of each commodity in each country. Europe is only divided into east, west and U.S.S.R. (including Asiatic Russia); the countries of Europe excluding U.S.S.R. are shown individually on an inset on which the symbols are to the same scale as on the parent map. According to need there are many additional maps on varying scales—but their actual scales and graticules are usually omitted. These more detailed maps are of particular interest: opening the Atlas at random one finds, for instance, a map of the Sudbury nickel-bearing deposits, scale 1 : 1,200,000, a whole page map of Scandinavia showing each water power station according to size (1 : 10,000,000), one showing the flow of bauxite from Guiana to the Gulf Coast and St Lawrence alumina works and thence of alumina to N. American aluminum works, a double-page map of European mineral production (1 : 7,500,000), and many showing the supposed origins of cultivated plants.

The maps are ingeniously designed for clarity even though the scales are small. They are based on simple conventions, hence no complicated key is necessary: they are almost self-explanatory. The temptation to use many colours has been avoided: black and red alone are used. The result is a refreshing change from the 'Joseph's coats' which are sometimes met in this type of work. A most welcome feature is the abundant provision of statistics, both on the face of the maps (where very seldom is a symbol without its figure) and in small additional tables. Thus for instance, a half-page map of whaling in the S. Hemisphere is accompanied by half a page of statistics classifying the catch according to type of whale, area in which caught, and nationality of catcher, for 1929-30, 1937-38 and 1951-52. Thus the Atlas may also be used as a source of statistics—all of which are in comparable units, be it noted.

Altogether the Atlas is most welcome. It digests a vast amount of information into a small compass and presents it clearly; it should be of value in schools, colleges and offices.

**Atlas of Economic Geography*. By J. HUMLUM. Pp. xii+127. London: Meiklejohn and Son Ltd., 1955. 15s. (\$2.50).

This English edition consists of the identical Atlas, printed in Copenhagen, together with an English version of the introductory matter, table of contents etc., printed in Edinburgh. The volume is on good quality paper and strongly bound in cloth. It can be thoroughly recommended. H. A. M.

Edinburgh World Atlas. Prepared and Edited by John Bartholomew. 14½×10. Pp. 1+108 (atlas)+160 (index). Edinburgh: The Geographical Institute, John Bartholomew & Son Ltd, 1954. 36s.

Offered as a general reference atlas of a convenient size for a "scientifically-minded public", *The Edinburgh World Atlas* is certainly an attractive proposition at a very reasonable price. This last consideration must be constantly borne in mind when offering critical or constructive comment. The atlas is attractively bound, it contains much first-class cartography, and it gives a balanced and useful world coverage.

The first section presents instructive facts and statistics relating to geographical terms, climate, population, map projections and geographical exploration, followed by general world maps. Then comes the main body of the work comprising ninety-six pages of continental and regional maps, with a proper emphasis on Europe, Asia and North America. Finally there are fifty-one pages of clearly printed index containing 24,000 names. National and regional maps are suitably scaled and delimited (although the binding rather interferes with the double page plates), and the selection of place-names is commendable.

One must, however, offer two major criticisms. Firstly the world maps are unsatisfactory on a number of counts: 'Physiography' is drawn on a projection which must confuse the average reader and the double plate is badly interfered with by the binding. 'Geology' would profit by a less terse key, 'Ethnology' receives too much space, a map of vegetation might be introduced alongside 'Soil', and the map showing mineral resources and agriculture is vague, rather obscure, and certainly calls for revision; 'Routes of Commerce' occupies a double page and is ugly and lacks clarity.

The second major criticism concerns the depiction of physical relief on the general reference maps, for here the layer colour printing varies in tone from map to map and is on the whole anaemic. Notable examples of this weakness are Scandinavia and India, and as a whole Mr Bartholomew's maps seem to have lost the character and life of those of the *Oxford Advanced Atlas* of 1942. The use of yellow or white to depict shallow sea areas must also raise a query, for nothing can alter the check on human activity imposed by the presence of water; the break with convention is in this case unconvincing.

On balance this is, however, an accurate and useful atlas. At the risk of an increase in price one might ask for fresh material in the form of continental maps, depicting individually, physical relief by 'shadowing', and agricultural land use and industrial exploitation: these latter aspects are of particular significance to-day on both national and world scales.

D. R. M.

Atlas of Australian Resources. Prepared by the Department of National Development; Canberra.

The Commonwealth Government, through the Department of National Development, Canberra, has undertaken the publication of an *Atlas of Australian Resources*, of which ten of the 42 maps are now available, six having been published in 1953 and four in 1954. The project is sponsored by the Division of Regional Development, directed by Mr G. Ruddock and the Atlas is under the editorship of Dr K. Frenzel.

The maps, on a polyconic projection, are on a generous scale (1:6,000,000) and are printed in up to ten colours, so that ample information can be given without excessive compression. While students of spatial economy may be grateful for the demonstrative value of the uniform presentation of the whole continent on each map, the economic geographer would have been equally grateful, given the marginal distribution of most of the known resources, for maps on a still larger scale at the expense of some restriction of the area included, to illustrate some of the topics. The value of the publication is very greatly enhanced by the commentaries accompanying each map and written by experts in the various Government departments. Together, these promise to provide a much-needed geographical handbook to Australia.

A number of the maps present experiments in economic cartography of great interest. That of mineral deposits differentiates mineral groups by colour and shows the importance of the deposit to the national economy by the shape of the symbol as well as the relative size by the size of the symbol. In the result the fuel base of the

Newcastle-Sydney area and the three polymetallic bases of western Queensland, western Tasmania and Broken Hill stand out clearly in that order from the wealth of detail, a gradation, however, far from representing the dominance of Broken Hill in value of actual production (in 1950, the year for which the commentary gives values).

The map of agricultural production shows by circles the average annual gross value of crops (with colour segments for individual crops) by administrative statistical divisions in the six years ending June 1951, against a background in which the percentage of cropped area to total area is shown by five gradations of green. The total effect is pleasing. Similarly, in the population map, settlements of 1,000 or more inhabitants are shown by spheres against a background in seven shades of yellow to indicate density of rural population, with solid dots for settlements of under 1,000 people, also included in the calculation of rural density. The spheres for capital cities also include their suburbs so as to lessen congestion in these areas.

Perhaps the most interesting map to the general user of the atlas will be that of major development projects. Type of project—land development, mining, forestry, fisheries, manufactures, energy, water conservation and supply, transport facilities—is shown by form and colour of symbol, with further subdivision by letters and multi-purpose projects by background colour. The extent of colour filling shows whether the project is at the construction, authorisation or planning stage and the kind of outline shows whether it is completely new or an extension of an existing scheme. The size of the symbol indicates capital cost and it is also possible to differentiate government and private enterprise. This is one of the most ingenious maps and, like the accompanying commentary, certainly one of the most informative.

The climate map includes types as differentiated by precipitation and temperature regimes, further sub-divided by situation. Numerous climatic diagrams indicate monthly maximum and minimum temperatures, absolute humidity, precipitation and frost period for characteristic stations. The accompanying commentary includes a useful diagram of cumulative frequency curves for annual precipitation. The underground water map shows, in addition to sites of flowing bores, availability of artesian and subartesian water and salinity.

Other maps published are rainfall, temperature, soils, state and local government areas. The publication of the remaining 32 maps of this important national atlas will be awaited with the keenest anticipation.

C. J. R.

PROCEEDINGS

A MEETING OF COUNCIL was held on Monday, 30th May 1955.

ANNUAL GENERAL MEETING

The Annual General Meeting will be held in the Society's Rooms in Edinburgh on Tuesday, 4th October, at 3.30 p.m.

LECTURE SESSION 1954-55

GLASGOW. Lecture Lunch in Ruhl Restaurant, followed by a talk, 'Incidentally' by LORD ROWALLAN, K.B.E., M.C., T.D., D.L., March 26th.

ANNUAL SUMMER EXCURSION

The Tweed Valley, May 28th.

CONTRIBUTORS TO *S.G.M.*, VOL. 71, NO. 2. SEPTEMBER 1955

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- C. J. R. ROBERTSON, Department of Geography, Edinburgh.

ATLAS OF ECONOMIC GEOGRAPHY

by Prof. J. Humlum, Ph.D.

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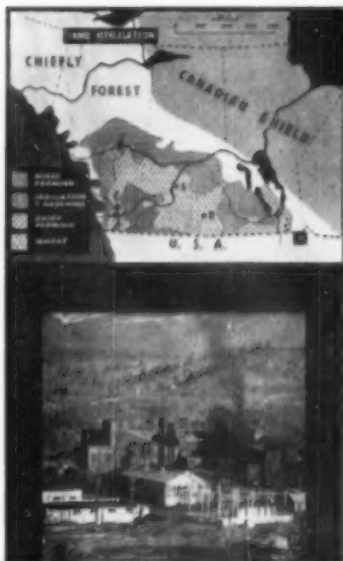
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THE TIMES

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